CLEAN AIR

1987

VOL.17 NO.2

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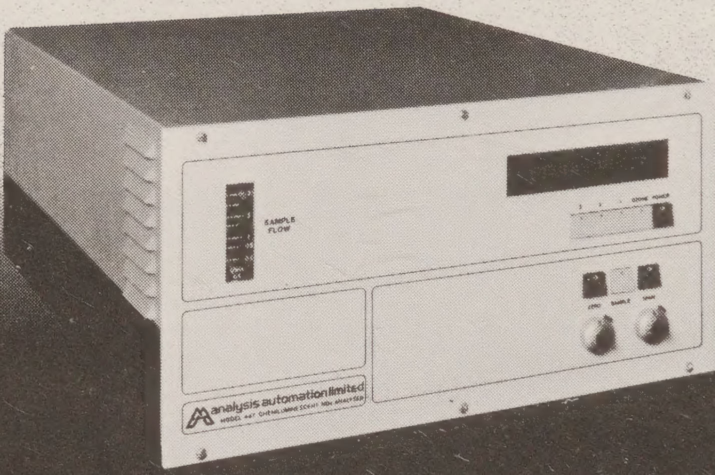

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OPPORTUNITY KNOCKS

This is the second in a row of bumper *Clean Air* issues. Because of staff changes, the next issue will also be a giant, combining *Clean Air*, Volume 17 Nos. 3 and 4. Apologies for any inconvenience are extended to our readers and advertisers.

1987 is proving to be a year of great interest and opportunity for the National Society for Clean Air, with scope for an expanded role in a changing climate of pollution control. The NSCA has already submitted its views on the way forward in response to the Department of Environment Consultation Paper on Industrial Air Pollution Control. Our response is set out fully in this issue, as is our thinking on ways of adapting the Building Regulations to cope with increasing concern about indoor levels of noise and air pollution. Among the NSCA membership there is a keen awareness of what the NSCA has to offer in drawing together points of detail as well as overall strategy considerations. The Yorkshire and Humberside Division has proposed a new system of technical input starting at the grassroots, divisional level, which would help to strengthen NSCA input on new control guidelines.

On noise, the NSCA has begun its detailed study into transportation noise and hopes to produce a regular output of research findings and policy recommendations, rather as it did so successfully in its investigation of sound insulation in flat conversions. Beginning with surveys of local authority Highways, Housing, Planning and Environmental Health Departments, the first aim is to pull together as much background information as possible on road transportation developments and the effectiveness (or otherwise) of Noise Insulation Regulations.

Finally, while it is unusual for *Clean Air* editorials to use the personal voice, I should like to take the opportunity of saying goodbye to readers of this journal, for which I have acted as Assistant Editor and then Editor for the past ten years. In bowing out of my post (but not my interest in clean air and environmental protection) I wish the NSCA and all those involved in its achievements an ever more successful and rewarding future. As one of our members says in a letter published in this issue, ''You're doing a great job''.

MODELLING THE DISPERSION OF RADIOACTIVE MATERIALS IN THE ATMOSPHERE – A REVIEW OF THE WORK OF A UK GROUP

by
J A JONES
Chairman of the Working Group
National Radiological Protection Board, Chilton

In November 1977 a meeting of representatives of UK regulatory authorities, the nuclear industry and research organisations was held to discuss methods of calculation of atmospheric dispersion for radioactive releases. Those present agreed on the need for a review of recent developments in atmospheric dispersion modelling and an Expert Working Group was established in order to facilitate the review. The Working Group reported to an informally constituted Steering Committee. The arrangements were made more formal in 1983 when the Steering Committee was replaced by an Atmospheric Dispersion Modelling Liaison Committee consisting of representatives of regulatory authorities and organisations connected with the nuclear industry. The terms of reference of the Liaison Committee can be summarised as to review current understanding of atmospheric dispersion and to identify suitable models for application primarily in authorisation and licensing of nuclear installations, and to establish Working Groups as necessary. The National Radiological Protection Board has provided the chairman, secretary and secretariat of the Steering and Liaison Committees and of the Working Group. The reports of the Working Group are intended to give practical guidance on the estimation of the dispersion of radioactive material in the atmosphere.

The Group has published seven reports[1-7], and papers describing the Group's work have been presented at three conferences [8-10]. This article briefly reviews the work of the Group to date and indicates those topics identified so far for attention in future. The Group's first four reports[1-4] cover the dispersion and deposition of material over uniform terrain for both short and continuous releases. The fifth report[5] covers the extension of the models to some more complex situations (releases near buildings, plume rise and coastal sites). The sixth report[6] considers in greater detail the problems of modelling wet deposition from a short release, while the seventh report[7] looks at the uncertainty inherent in dispersion modelling. In this review the Group's work is described by topic, rather than treating each report as a separate entity.

DISPERSION FROM A SHORT RELEASE AT SHORT AND MEDIUM RANGE

The Group's first report[1] describes models for calculating air concentrations of material which does not deposit on the ground in situations where the release duration and travel time are sufficiently short that the atmospheric conditions can be assumed to be constant. The report is confined to release from point sources not affected by buildings and for travel over uniform flat terrain. The second report[2] describes the extension of the model to include dry deposition and, for a limited application, wet deposition. The fifth report[5] describes ways of allowing for the effects of buildings near the release point, for coastal sites and for plume rise, and gives guidance on values of the deposition velocity and washout coefficient for use in the models described in the earlier reports.

The basic model recommended by the Group in its first report[1] for calculating concentrations for a release from a point source over flat terrain is a Gaussian plume model. The simple model was somewhat modified to allow for reflection from the ground and a 'lid' at the top of the mixing layer. In order to specify parameters for use with the model it is necessary to classify meteorological conditions into a series of categories. The Group adopted the categorisation scheme proposed by Smith[11] which was developed from the original Pasquill[12] formulation. The scheme classifies atmospheric conditions on the basis of the sensible heat flux and wind speed. Full details are given by Smith[11] and in the Group's first report[1].

The Group hoped that measured values of wind speed would be available, and the first report therefore gives a nomogram, taken from work by Smith[13], which allows the depth of the mixing layer to be determined during the day from wind speed and cloud cover. However, it also gave average values for depth of the mixing layer and for wind speed for each stability category for use when no other information is available.

The Group adopted Smith's procedure[11] for determining the value of σ_z (the standard deviation of the vertical Gaussian plume profile) as a function of distance from the source for specific values of roughness length and stability parameter. The scheme is presented graphically by Smith. The horizontal spread of the plume includes contributions from both turbulence and the effects of variations in the wind direction. The Group adopted the values of the standard deviation of the horizontal Gaussian plume profile due to turbulence given by Gifford[14], and suggested that the standard deviation of the horizontal Gaussian plume profile distribution due to wind fluctuations should be calculated from the standard deviation of the horizontal wind direction[15]. When this is not available a formula suggested by Moore[15] should be used.

DRY AND WET DEPOSITION

The Group's second report[2] describes a method of extending the basic model to allow for dry deposition. Deposition rates are calculated using the deposition velocity, while concentration in air allowing for plume depletion is obtained using the source depletion model[16]. The Group, in its fifth report[5], reviewed the available evidence on the value of the deposition velocity. Typical values are given for a reactive gas such as molecular iodine, particles of about 1μm AMAD (Aerodynamic Mean Activity Diameter) and about 10 μm AMAD. The model adopted by the Group is not appropriate for particles whose aerodynamic diameter is much greater than 20 μm as it makes no allowance for gravitational settling.

The second report also describes an extension of the model to include wet deposition. The method allows for the effects of dispersing material passing between wet and dry regions. It is intended primarily for use for a continuous release (see below) and is not appropriate to a specific short release. The Group returned to the topic of wet deposition from a short release in its sixth report[6]. This report discusses the problems caused by the spatial and temporal variations in rainfall rate and in describing dispersion when plume depletion differs significantly across the plume. The Group concluded that a simple model is unlikely to give an adequate prediction of the dispersion and deposition of a specific short release in wet conditions. However the Group identified a number of simple formulae which may be of use in certain situations. The inherent assumptions and areas of applicability of these models are identified.

EFFECTS OF BUILDINGS NEAR THE RELEASE POINT

The effect of buildings near the release point is considered in the Group's fifth report[5]. No single model was identified for use in all the situations of interest, instead a series of models was given for different applications. A relatively simple model, based on work by Fackrell[17], was recommended for use when calculating concentrations within the building near wake, up to about three building heights downwind, for a source which becomes fully entrained into the wake. For calculating concentrations in the main building wake for a source on or just above the building, the Group recommended the virtual source model[18]. The concentration is given by the Gaussian model with the plume standard deviations modified to allow for increased turbulence due to the presence of the building. The Group's report also identifies suitable models for use in other situations, such as a short stack on a building roof or a release within the main wake of a building.

PLUME RISE

The Group's fifth report[5] deals with models for plumes rising from isolated sources and from sources near buildings. The Group considered that either Moore's[19] or Briggs'[20] model should be used for plumes rising from isolated sources. The need to allow for plume expansion caused by its rise when calculating group level concentrations is pointed out. The Group felt that it could not recommend a model for the rise of a plume released in a building wake. However, the Group was able to specify simple criteria for determining whether or not plume rise would be important.

COASTAL EFFECTS

Differences between dispersion at inland and coastal sites arise because there are differences in atmospheric stability over land and water when the temperatures of the two surfaces differ. If the water is colder than the land, then the air over the water is more stable than that over land; there is an interface between the regions of different stability. In this situation, with an on-shore wind, material released within the unstable regions would be prevented from dispersing upwards by the boundary region. However, material released in the stable layers would be carried inland, with relatively little dispersion until it encountered the growing unstable layers when it would rapidly be brought to the ground. The Group's fifth report[5] describes a way of extending the original model to include these effects. The work was restricted to on-land wind directions; cases where the land was colder than the sea could be treated by the standard models appropriate to an inland release.

The fifth report also recommends a modified Gaussian model for predicting concentrations during a sea breeze. Formulae are given for the speed of the sea breeze in terms of the land-water temperature difference, and for the rate of plume growth reflecting typical turbulence levels during sea breezes. The Group felt that the trajectory of material affected by a cycle of land and sea breezes could not be predicted at present by simple models.

DISPERSION FROM A CONTINUOUS RELEASE AT SHORT AND MEDIUM RANGE

Dispersion from a continuous release over distances such that atmospheric conditions can be considered constant during plume travel are considered in the Group's first report[1]. As with short releases the model in the first report is confined to material which does not deposit to the ground. Extensions of the model to include dry and wet deposition are described in the Group's second report, while the fifth report describes ways of allowing for the effects of buildings, coastal sites and plume rise, and gives guidance on the value of deposition velocity and washout coefficient.

The model for continuous releases was obtained by making a simple modification to the model for short releases. In the model, the concentration due to material released in a specified meteorological category is assumed to be constant across an angular sector, the width of which is determined by the detail in which the data on distribution of wind direction is available. The vertical distribution is assumed to be Gaussian, but modified by reflections from the ground and the top of the mixing layer. The average concentration in each sector is obtained by summing the concentration in each meteorological category weighted by the relative frequency of the category. Dry deposition is included in the model by the same method as for short releases, but the correction for plume depletion must be made separately for each category.

The Group, in its second report[2], recommended a model for wet deposition which includes the effect of rain starting and stopping during the time taken for material to travel from the source to the point at which the concentration is to be calculated. The model is based on work by Rodhe[21], Smith[22] and Fisher[23]. The model considers the overall distribution of wet and dry periods and derives the probability of material remaining in the plume for a given travel time should it be dry or wet at that time. The value of washout coefficient for use in this model is considered in the fifth report, where values are suggested for particulate material and for iodine.

The methods described above for modifying the model for short releases to include effects of buildings, plume rise and coastal sites are equally applicable in the case of a continuous release. However, the modifications must be undertaken in each category separately before the weighted summation is carried out. The Group's fifth report[5] also considers certain aspects of the averaging process for building effects and coastal sites.

DISPERSION FROM A CONTINUOUS RELEASE AT LONG RANGE

This topic is the subject of the Group's third report[3], where a suitable modification to the model described above for short and medium ranges is identified. The travel time to great distances is such that it is not possible to assume that the atmospheric conditions remain constant during the plume's travel. The Group considered that the average effects of category changes during travel could be approximated by assuming that the whole of the travel occurs in average conditions which are represented as category D. The Group also recommended that the wind velocity should be taken as the geostrophic wind velocity, and gave a typical geostrophic windrose for use when better information is not available. The methods for dealing with wet and dry deposition in the long range, continuous release model are the same as those in the short and medium range continuous release model.

DISPERSION FROM A SHORT RELEASE AT LONG RANGE

The Group was asked to give a model for long-range dispersion from a short release for only a limited number of situations. The Group's recommendations are contained in its fourth report[4]. The model is not intended for use when evaluating concentrations from a specific short release, but gives information on the probability distribution of concentration following a short release. The Group considered that it was not necessary to give a model which represented a continuous extension to long range of its model for short range. The model assumes that material is uniformly spread vertically throughout the mixing layer and that horizontal spread is governed by diffusion and changes of wind direction during the release and the subsequent dispersion.

UNCERTAINTY IN DISPERSION MODEL PREDICTIONS

The Group's seventh report[7] considers the reasons for discrepancies between observed and predicted concentrations and contains indications of the likely magnitude of the differences. The Group described a number of sources of uncertainty such as the random nature of atmospheric motions, the idealisations inherent in a model and the difficulty of selecting appropriate values for the model's parameters. The Group suggested likely ranges for the values of the main parameters in dispersion modelling. The report contains a brief survey of attempts which have been made to validate models similar to those suggested by the Group. It also describes some of the assumptions inherent in models and indicates the conditions for which they are valid.

PRESENT AND FUTURE WORK

The Working Group has suggested to its parent Liaison Committee that there are a number of situations of interest for which simple models are not appropriate and that the Group should begin to develop a more complex, modular model for these situations. The Group is currently considering how to organise the development of such a model and what could be included in it.

There are also a number of other situations for which simple models may be appropriate, and which have not yet been tackled by the Group. The Group is considering models for some aspects of dispersion at low wind speed, further advice on plume rise from a building wake and deposition from mist or low-lying cloud ('occult wet deposition'). Reports on these topics will be published in due course.

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NSCA CIVIL NUCLEAR POWER WORKING GROUP

The Society embarked last year on a review of civil nuclear power matters, an extended working group enquiry which will culminate in a detailed report and policy statement. An interim report reviewing evidence collected to date is currently being prepared. The Working Group has received briefings on the following questions: radiation monitoring after Chernobyl, nuclear electricity generation — monitoring of discharges and plant safety; radiation dose limits, and the case against civil nuclear power developments. Organisations providing evidence have included the CEGB, NRPB and Friends of the Earth. The Working Group is to consider waste disposal aspects at its next meeting.

FUTURE EVENTS

21 – 22 JULY 1987 – SYMPOSIUM – "ENVIROCHEM '87 – ENVIRONMENTAL ANALYTICAL CHEMISTRY AND POLLUTION MONITORING" – covering all major aspects of environmental pollution: atmospheric, fresh water/lacustrine, terrestrial and marine/estuarine.
Organisers: Phillips Scientific & Analytical Equipment
Venue: Robinson College, Cambridge
Details: Linda Doggett, Pye Unicam Ltd., York Street, Cambridge CB1 2PX (0223) 358866

23 – 25 SEPTEMBER 1987 – "FILTECH EUROPA" EXHIBITION AND CONFERENCE
Theme: How to use, design and manufacture filtration/separation equipment products better and maximise profits.
Venue: Royal Netherlands Industry Fair, Utrecht, Holland
Organisers: The International Filtration Society
Details: The Filtration Society, Dept. Chemical Eng., Loughborough University, Loughborough, Leics. LE11 3TU and from Filtech Exhibitions, 48 Springfield Road, Horsham RH12 2PD.

29 SEPTEMBER – 1 OCTOBER 1987 – INTERNATIONAL SYMPOSIUM – '"ENVIRONMENTAL METEOROLOGY" – covers a variety of topics related to meteorology and environmental pollution.
Organisers: VDI – Commission on Air Pollution Prevention, supported by the German Meteorological Society.
Venue: Wurzburg, Congress Centre, West Germany
Details: VDI-Kommission Reinhaltung der Luft, Dr. J. Lobel, Dipl.-Ing. M. Paduch, P.O.B. 11 39, D-4000, Dusseldorf FRG Tel: (0211) 62 14-255 or 62 14-404

12 – 13 OCTOBER 1987 – SHORT COURSE ON ION CHROMATOGRAPHY
Organisers: International Association of Environmental Analytical Chemistry
Sponsors: Elsevier Science Publishers B.V. Instrument Companies, National Organisations
Venue: School Centre, Sils-Maria, Switzerland
Topics: Sample handling, enrichment, clean-up, automation; dual and single column concepts; theory and practice of in separations (isocratic) and gradients; detection principles; applications in the pharmaceutical, environmental, biomedical, alimentation fields.
Details: Workshop Office IAEAC, M. Frei-Hausler, Postfach 46, CH-4123 Allschwil 2, Switzerland Tel: (00416) 632789 and (004161) 732950

14 – 16 OCTOBER 1987 – 5TH SYMPOSIUM ON ION CHROMATOGRAPHY – CALL FOR PAPERS

Topics: dual column concept and detection by conductometry; single column systems; new detection principles; trace enrichment and clean-up procedures for trace ions in complex matrices; new separation mechanisms (such as ion-pairing, complexation, ligand exchange); new phases; new application areas for organic and inorganic ion analysis in biological, environmental and industrial samples; and automation possibilities. Submission for brief research presentations verbally or as poster is possible until 1 September 1987. **Send title and short abstract (100 words) to:** Prof. Dr. R.W. Free, Free University, Dept. of Analytical Chemistry, De Boelelaan 1083, 1081 HV Amsterdam, The Netherlands.

Organisers: International Association of Environmental Analytical Chesmitry
Venue: School Centre, Sils-Maria, Switzerland
Details: as above

26 – 30 OCTOBER 1987 – 5 ONE DAY COURSES – 26 OCT.: "MONITORING THE WORKPLACE ENVIRONMENT" 27 OCT.: "MONITORING FOR DUSTS, FIBRES AND GASES" 28 OCT.: "NOISE MEASUREMENT" 29 OCT.: "NOISE CONTROL" 30 OCT.: "NOISE MANAGEMENT PROGRAMME"

Organisers: ROSPA, Occupational Safety Training Division
Venue: ROSPA Occupational Training Centre
Details: ROSPA Occupational Training Centre, 22 Summer Road, Acocks Green, Birmingham B27 7UT, Tel: 021 706 8121

2 – 6 NOVEMBER 1987 – SHORT COURSE – "THE CONTROL OF INDUSTRIAL NOISE – HEARING LOSS PROTECTION" – covers legislation on noise levels in the workplace; and demonstrates the technical basis for effective noise control measures with minimum cost.

Organisers and Venue: Centre for Extension Studies, Loughborough
Details: Sonia Withers, Course Tutor, Centre for Extension Studies, University of Technology, Loughborough, Leicestershire LE11 3TU.

5 – 8 NOVEMBER 1987 – CONFERENCE – "REPRODUCED SOUND 3" – covers the acoustical aspects of reproduced sound in order to exchange information on developments in the subject.

Organisers: Institute of Acoustics, AES, ASCE, EMAS and APRS
Venue: Windermere Hydro Hotel
Details: Dr. R. Lawrence, FIOA, Conference Organiser, Institute of Acoustics, 25 Chamber Street, Edinburgh EH1 1HU, Tel: 031-225-2143.

26 – 29 NOVEMBER 1987 – CONFERENCE – "INDUSTRIAL NOISE" – covers the control of noise and vibration in the environment and the workplace.

Organisers: The Industrial Noise Group
Venue: Windermere Hydro Hotel
Details: Dr. R. Lawrence, FIOA, Conference Organiser, Institute of Acoustics, 25 Chambers Street, Edinburgh EH1 1HU, Tel: 031-225-2143

1 – 3 DECEMBER 1987 – SEMINARS AND EXHIBITIONS – "ASBESTOS '87" covers setting up, monitoring and controlling of operations involving the removal and treatment of asbestos.
Organisers: LAAPS
Venue: LAAPS, The County Hall, London
Details: Derek Stow, Head of Safety Services, Room B43, County Hall, London SE1 7PB, Tel: 01 633 1010

17 – 18 DECEMBER 1987 – INTERNATIONAL CONFERENCE – "UNDERWATER COMMUNICATION AND POSITION FIXING" – covers all aspects of underwater communication and telemetry, navigation and position fixing.
Organisers: Underwater Acoustics Group of the Institute of Acoustics.
Venue: University of East Anglia, Norwich, England
Details: Dr. Rodney Coates, Conference Chairman, School of Information Systems, University of East Anglia, Norwich NR4 7TJ, England, Tel: 0603 592582

1988

20 – 25 JANUARY 1988 – 3RD INTERNATIONAL EXHIBITION & CONFERENCE ON POLLUTION MONITORING, CONTROL AND INDUSTRIAL SAFETY – "ENVIROTECH '88".
Organisers: Chemtech Foundation – Environmental Management Centre
Venue: Bombay, India
Topics: Air quality: monitoring and control; water quality: monitoring and liquid effluent treatment; industrial safety: disaster prevention and crisis management; economics of pollution control; noise pollution control; solid waste management: industrial and municipal; and toxic effects of pollution on public health.
Details: Chemtech Secretariat, Taj Building, 3rd Floor, 210, Dr. D.N. Road, Bombay 400 001, Tel: 2042044 (4 lines) Gram: CHEMTECH, Telex: 011-4253 JSCO IN, 011-2775 JSIP IN

54th NSCA CONFERENCE
BRIGHTON 26 – 29 OCTOBER 1987

The 54th Clean Air Conference celebrates the European Year of the Environment with a packed programme covering air pollution and noise control, and a whole day symposium on Civil Nuclear Power. With a Presidential Address at the opening session followed by six full conference sessions during which 16 papers will be presented by leading speakers (among them Sir John Mason, FRS, Dr. Judith Lang [President of the International Association Against Noise], John Collier, Chairman of the UK Atomic Energy Authority, Robin Grove-White, retiring Director of CPRE and Derek Davis, Board Member, CEGB) it
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SMOKE CONTROL

CLEAN AIR ACT 1956
EXCHEQUER CONTRIBUTION TO SMOKE CONTROL ORDERS

The Department of the Environment has written to all local authorities who submitted programmes for 1987/88 notifying them of their allocations. The schedule of figures for individual authorities is as follows:

REGION AND LOCAL AUTHORITY	£
Northern	
Blyth Valley	25,713
Gateshead	51,430
Langbaurgh	158,000
North Tyneside	70,500
South Tyneside	80,000
Wansbeck	382,489
North West	
Bolton	104,000
Copeland	49,440
Liverpool	55,984
Oldham	1,758
South Ribble	17,931
St Helens	20,000
Yorkshire and Humberside	
Barnsley	234,076
Doncaster	409,024
Rotherham	242,736
Hull	21,120
Selby	73,714
Wakefield	86,000
East Midlands	
Ashfield	43,798
Bolsover	37,224
Bassetlaw	66,000
Erewash	14,671
Gedling	8,487
Mansfield	52,286
Newark	22,633
Nottingham	56,810
West Midlands	
Dudley	22,572
Lichfield	48,698
Newcastle-under-Lyme	14,628
Nuneaton	22,756
Staffordshire Moorlands	100,000
East Staffordshire	7,000
Worcester	36,400
Solihull	33,410
Eastern	
Peterborough	5,714
South West	
Bath	16,630
Bristol	23,984
Cheltenham	30,856
Northavon	16,000
South East	
Broxbourne	4,857
Oxford	43,301
Slough	9,440
London	
Southwark	19,500
Barnet	20,992

MAXIMUM COST LIMITS

Para 10/Annex C, Circular 1/81

Yorkshire and Humberside	£400
Northern	£375
West Midlands	£325
East Midlands	£325
North West	£300
South West	£250
Elsewhere	£200

AIR POLLUTION CONTROL – REVIEW AND PROPOSALS NSCA RESPONSE

To the Department of the Environment,
Scottish Development Department and
Welsh Office
Consultative Document dated December 1986.

LAYOUT

Comments are arranged as follows: Section A Points of General Principle; Section B Summary Response to Paragraph 3 Questions; Section C Detailed Response to Paragraph 3 Questions; Section D Other Comments; Annex A List of Offensive Trades – Proposed Additions.

A. POINTS OF GENERAL PRINCIPLE

1. We strongly endorse the need for consolidated legislation – we agree that air pollution control legislation should be rationalised and improved, but hold that there is a wider need for a new, comprehensive pollution control statute to give real effect to BPEO. The Consultation Document, however, suggests a piecemeal approach, even in the case of air pollution control, which we would deprecate.

2. We are concerned about the possibly extended timescale for the introduction of the proposed changes – will measures be introduced in time to meet the requirements of the "framework" directive?

3. The NSCA generally supports the retention of BPM but urges that the emphasis should always be on *"prevention"* of air pollution, and other forms of contamination and environmental degradation. We would draw attention to specific reservations in our detailed comments (Section C). As to prosecutions under the new system, we believe that these should be for breach of consent conditions as well as for failure to practise BPM.

4. While we support the "1 works, 1 agency" approach, we consider that this will still present difficulties while separate statutes are being administered and could hinder a BPEO approach. For example, where the central inspectorate has control of air pollution aspects, local authority or factory inspectorate control of noise aspects could still be appropriate and might lead on occasions to a conflict of interest.

5. We consider that a further technical review is needed in some areas, eg of the Special Use Classes Order, and of issues not covered, eg road vehicle emissions control.

6. Finally, we are most concerned that the resource implications of these present proposals and others that must surely emerge soon to give full effect to BPEO have not been fully calculated and considered. We believe that the success of these vital measures could be jeopardised from the outset if the necessary manpower and equipment cannot be adequately financed.

B. SUMMARY OF RESPONSES TO PARAGRAPH 3 QUESTIONS

i. Retaining BPM (paragraphs 16-17); support, with reservations.

ii. Giving the Secretary of State new powers to set by Regulation air quality standards and emission limits (paragraph 18); support — the two powers should be linked.

iii. Giving local authorities a power of prior approval and a power to require the use of BPM (paragraph 22); support conditionally.

iv. The proposed broad allocation of processes for control by the national Inspectorates and by local authorities (paragraphs 22 and 31 and Annex B); support — but resources inadequate.

v. The need to retain the Special Industrial Classes in the Town and Country Planning (Use Classes) Order 1972 and its Scottish equivalent (paragraph 23); support retention and call for technical review.

vi. Scheduling of certain offensive trades (paragraph 25, Annex C and Annex D, paragraph 21); accept proposal with additions.

vii. The categories of furnace which should be scheduled (paragraph 28); accept proposal with conditions.

viii. A new consent system (paragraphs 32-38); support conditionally.

ix. The appropriate timescale for appeals against refusal to grant consent or against specific terms of the BPM agreement (paragraph 38); three months — note additional comments.

x. How central guidance on scheduled processes should be prepared (paragraphs 39-41); note detailed suggestions and reservations.

xi. The sort of information about the air pollution control system that should be made publicly available, and how it should be presented (paragraphs 42-48); support, but note detailed comments.

xii. The control of gaseous emissions from furnaces (paragraph 49); support proposal with one reservation.

xiii. How far dark smoke from industrial or trade premises is a problem (Annex D, paragraphs 1-4); problem acknowledged — proposal supported.

xiv. Action to control the sale of unauthorised fuel in smoke control areas (Annex D, paragraph 5); problem acknowledged — solution proposed in detailed comments.

xv. The effect of repealing the appeal provisions of the Clean Air Acts (Annex D, paragraphs 6-7); retention of appeal provisions supported.

xvi. The extension of statutory nuisance provisions to non-dark smoke and other emissions from private dwellings (Annex D, paragraph 8); supported — with additions.

xvii. How to control illegal cable burning (Annex D, paragraphs 9-13); proposal supported with additional comment.

xviii. The control of the contents of fuel (Annex D, paragraphs 14-15); proposal supported with reservation re definitions.

xix. Various amendments to Part III of the Public Health Act 1936 dealing with statutory nuisance – principally to streamline the system, give local authorities anticipatory powers, to make best practicable means a defence generally, to allow codes of practice to be issued and to make it clear that "effluvia" includes smell (Annex D, paragraph 17); proposals supported.

xx. Restricting the ambit of Section 100 of the Public Health Act 1936 (Annex D, paragraph 18); retention of Section 100, suitably amended, is supported.

xxi. Repealing "offensive trades" provisions and setting up an arbitration system for non-scheduled animal rendering plants (Annex D, paragraphs 21 and 22); supported with additions to Annex C and some reservations.

xxii. Extending local authorities' powers to control urban pests (Annex D, paragraph 23); supported.

C. DETAILED RESPONSE TO QUESTIONS (i) TO (xxii)

i. Retention of the "Best Practicable Means" (BPM) Approach to Air Pollution Control (paragraphs 16-17)

The NSCA generally supports both the BPM and BPEO approach to (air) pollution control, pressing always for the higher standards that should be attainable but which are too often lacking. The need to take financial considerations into account has sometimes proved a major obstacle to securing acceptable air quality at a particular locality by an early date. A wider interpretation of the "Polluter Pays Principle" should be given effect in the UK so that government help or financial aid from other sources might be forthcoming when new controls appear urgently necessary yet too costly for the industry concerned. Above all, BPM should be applied as a positive step using modern techniques to reduce pollution by requiring existing plant as well as new plant to operate within the strict standards now being applied in Europe. The BPM principle should not be used as an excuse for less stringent standards in the UK. For example, the majority of oil fired boilers in the UK are currently incapable of meeting the EEC standards of solid emissions – and the introduction of new fuels is likely to further exacerbate the problem; suitable control technology is readily available and should be applied.

Although BPM requires that residual emissions should be rendered "inoffensive" we question the practicability of its further extension to the control of nuisance caused by odours (as opposed to chemical pollution). Odours are difficult and awkward to measure and complainants are not satisfied until the nuisance ceases.

Finally, new legislation should be capable of taking into account changing expectations – both nationally and internationally – regarding acceptable standards.

ii. Powers to set by Regulation Air Quality Standards and Emission Limits (p 18)

Subject to the general consideration that the powers available to the Secretary of State should equate to those imposed on our Community competitors, the proposals to give the setting of air quality standards and emission limits the force of law are supported. Noting that the BPM approach is reactive, we consider that combining air quality or environment quality goals with BPM should stimulate achievement approaching "State of the Art" – which is not happening at present. With regard to the setting of emission limits, we are concerned that these should not be applied so rigidly as to hinder implementation of "State of the Art" developments, and that all such national limits should be as established at EEC level. Emission limits should be incorporated into BPM notes.

The central pollution inspectorate and local authorities should have a statutory responsibility to take air quality standards into account when setting BPM.

Similarly, the Secretary of State should have regard to air quality standards and objectives when setting emission limits and product standards. We welcome the proposed power to enable the Secretary of State to set area-based emission limits to enable the implementation of the "bubble" or collective emission control concept.

Finally, we note that emission limits are not at present applicable to odours.

iii. Giving Local Authorities the Power of Prior Approval and a Power to Require the Use of BPM (p 22)

The Society welcomes the proposal, considering that the interests of public health are best served by prevention rather than the application of post-facto control. The legislation must ensure that the new powers are applied evenly throughout the country as far as possible. We consider that the following factors should apply:

a) the BPM guidelines should be reasonable with provision made for their regular review;

b) where local authorities lack knowledge of the plant to be controlled there should be statutory provision for appropriate training to be given;

c) in view of the broad spectrum of political affiliations with which business has to deal the legislation should ensure that the guidance provided centrally will be politically neutral;

d) the guidance notes should be given a quasi-legal status similar to that accorded to Codes of Practice under the HSW etc Act;

e) where local authorities wished to impose conditions more severe than those laid down in the guidance, there should be a system of appeal with final resolution through the courts.

As legislation to permit BPM to be extended to cover a new local nuisance will be difficult to draft, it would be better to ensure that there is no nuisance from the outset.

iv. Allocation of Processes for Control by National Inspectorates and by Local Authorities (p's 22 & 31, Annex B)

The proposed allocation is broadly regarded as logical, given the technical expertise and personnel in the national Inspectorates and local authorities. However, we are concerned that these resources may sometimes be insufficient, particularly in manpower terms, for the task.

The policy of a single enforcement agency control for individual works is generally supported, but the final wording of the regulations should incorporate precise definitions to prevent demarcation problems. There should be a "requirement" rather than a "provision" for sites including processes from both parts A and B to be controlled by one agency and provision should be made for the agency to be changed by agreement.

Note: Where noise control is required, we assume this will be administered by Local Authority/Factory Inspector as appropriate.

v. Retention of Special Industrial Classes in the Town and Country Planning (Use Classes) Order 1971 and its Scottish Equivalent (p 23)

The aim should be to avoid increased pollution where processes have been changed or extended. There is scope for rationalising the Special Industrial Classes in the Town and Country Planning (Use Classes) Order but they should not be dispensed with entirely. The planning control system enables consideration to be given to all possible environmental effects, including noise, traffic and the visual environment. The offensive uses listed in the Special Industrial Use Classes are classified not just on the basis of air pollution effects, but on other environmental effects as well. Planning control also provides an opportunity for consultation with the general public. Therefore, although the Special Industrial Use Classes could be brought up to date and perhaps grouped together into fewer classes, they should not be merged into the General Industrial Use Class. A fuller technical review of SIU classes is required. Finally, we consider that a safeguard such as a "No Nuisance Provision" in the consent will be required to prevent changed or different processes being used after a consent has been given.

vi. Scheduling of Certain Offensive Trades (p. 25, Annex C and Annex D, p 21)

The arguments in favour of scheduling certain "offensive trades" within Schedule B are accepted. Control through bye-laws and limited duration renewable consents is out-dated when compared with scheduling supported by properly conceived BPM guidance.

Although it is not argued that all farming activity should be scheduled, some on-farm activities give rise to significant problems of nuisance.

Proposed additions to Part II of Annex C are listed at **Annex A** to this submission.

vii. Categories of Furnace to be Scheduled (p 28)

The proposal is logical and will simplify procedures. However, no provision appears to have been made for furnaces which burn a mixture of fuels and the consequential legislation should cater for these.

viii. A New Consent System (p's 32-38)

Subject to the undermentioned detailed comments we regard the proposals for implementing the consent system as orderly and fair. The proposal for central Inspectorates and local authorities to have power to determine "the quantity or nature of raw materials processed for fuel use" could restrict the flexibility with which a process plant is operated, although some furnaces burning waste oil and wood waste (with variable plastics content) should be considered. We consider that the regulation should be precisely worded to ensure that it meets the purposes for which it is intended and could not be used for other than technical ends.

Detailed Comments:

a) With regard to the introduction of consents, a period of 12 months as a maximum from the circulation of BPM guidance would appear sufficient for issue of a full consent, unless a local authority is dealing with an abnormal number of scheduled premises.

b) The paper does not make clear how the retention of BPM is to be reconciled with the consent system; it might be possible for a discharger to comply with all written consent conditions and still be open to prosecution for failure to observe some other aspect of BPM not specified in writing as a condition. Conversely, if the intention is that failure to comply with a consent condition could still be regarded as being within BPM the written consent would mean little. This difficulty could be overcome by specifying that consent is granted subject to BPM being applied with the consent document including the principal BPM requirements. Prosecutions would then be for failure to comply with both BPM and consent conditions. Relationships between BPM, established emission limits and air quality standards and written consents require clarification. Where applicable, consents should include emission standards at least as stringent as any limit laid down in Regulations.

c) Authorisation of new works should include the requirement of "No Nuisance". This should also apply to existing works after a reasonable, albeit short, time limit.

d) The system should be extended to include technological advances and developments to permit the use of previously unacceptable fuels; thus provision for regular review of guidance notes and consents is considered essential.

e) Provision should be made for local authorities to extend the processing of consents beyond two months as necessary and to cater for appeals.

f) Local authorities should be permitted to levy a charge for consents which reflects the real cost of their processing.

g) Since the measurement of dioxins in emissions is extremely difficult, involving substantial equipment costs, consents for incinerators should make appropriate provision.

ix. Timescale for Appeals Against Refusals to Grant Consent or Against Specific Terms of the BPM Agreement (p 38)

a) Three months would provide greater flexibility than eight weeks and would be in line with appeals handled by the Water Inspectorate and thus appropriate to the new unified Inspectorate of Pollution.

b) There should be provision for the formal withdrawal of an application, to cover cases where the application was defective but still otherwise bound to be dealt with by refusal once received by the local authority. As with planning legislation, non-decision within the statutory period should result in deemed refusal.

x. How Should Central Guidance on Scheduled Processes be Prepared? (p's 39-41)

The consultation document has made no reference to the engineering judgements fundamental to the establishment of gas cleaning standards. This is a serious omission since in many cases engineering factors, including detailed problems in installing plant, decree what is possible. Where the guidelines are insufficiently detailed the imposition of effective constraints would not be possible and the guidelines would not be legally acceptable. We are also concerned that official guidance and technical advice may be both too general and dated when finally published. It would be invidious if a plant causing a proven nuisance in a neighbourhood could plead that it had followed (inadequate) "official guidance and advice". To overcome this problem, existing sources of technical advice should be used to the full.

The central advisory body should include representation from independent bodies representing a broad range of public interest, notably the NSCA.

xi. Provision of Information: What Should be Made Available, How Should it be Presented? (p's 42-48)

In accepting the discussion and conclusion put forward in these paragraphs, the NSCA fully supports the proposals put forward in paragraph 48 including the presentation of emission tests in a suitably tailored format. The legislation should make clear that "register" can be interpreted to mean any suitable form of record and state where the registers are to be held. We support the concept of publicly available registers in Council and national Inspectorate offices and the continued publication of detailed annual reports by environmental health departments, district inspectors, and the Chief Inspector(s). The availability of other information acquired and held by local authorities under various statutory provisions should be indicated to interested members of the public on an Index. Copies of National Inspectorates' registers should also be made available in the relevant local authority offices, so that all information on air pollution is accessible in one place.

This said, the Society would be reluctant to see the registers becoming regarded as a list of offenders. Problems should no be hidden, but equally registers should stress the positive aspects of pollution control by explaining the measures taken to control pollution and the success achieved. In many circumstances such information could provide a helpful counter balance, which will help secure the full cooperation of industry in obtaining the necessary information.

Finally, although paragraph 45 refers to the low level of use of Section 79 of the Control of Pollution Act, its continued presence on the Statute Book is an incentive towards the collaborative gathering of information. Wider use might be made of this section if the concomitant duty on the local authority to debate the information at a specially constituted and regularly convened public committee (Sub-Sections 8 and 9) did not exist.

xii. Control of Gaseous Emissions from Furnaces (p 49)

In supporting the thrust of the proposals in paragraph 49, we consider that it should be made clear whether the proposal is a broad catchall or focussed specifically on dirty fuel. Otherwise, the proposal to add "fumes" to the scope of the Secretary of State's powers to make regulations is a progressive move and proposals regarding the scheduling of incinerators, large furnaces and RDF fired plant are fully supported.

xiii. How Far is Dark Smoke from Industrial or Trade Premises a Problem? (Annex D, p's 1-4)

On occasions in many local authority areas, the existing law has proved seriously defective. Thus we welcome the measures proposed (paragraph 3 of Annex D) which we see as necessary and appropriately effective.

xiv. Action to Control the Sale of Unauthorised Fuel in Smoke Control Areas (Annex D, p 5)

Sales of unauthorised fuel in smoke control areas present a continuing problem which from time to time reaches serious proportions. In considering making it an offence to sell raw coal from retail premises located in smoke control areas, it is impossible to differentiate between shops inside the smoke control area and on the periphery – particularly in conurbations where smoke control is incomplete and major roads are used as the boundary. While this may be accepted as unfair for such areas, to use it as a reason for not banning sales from shops in towns and cities which have completed their programmes and which are wholly smoke controlled is equally unfair – the more so as the concerned Authorities watch their best efforts being eroded. Effective legislation could be based on the precedent set by the 1968 Caravan Sites Act which embraces the principle that local authorities may not take advantage of the rigorous measures to control unauthorised camping permitted under the Act unless the authority has provided sufficient camp sites to meet normal area needs. Under this system local authorities meeting the sites provision requirement may apply for "designation" as authorities where the full force of the Act prevails. Accepting this parallel, where a local authority has completed a smoke control programme and the whole area is covered, it should be able to apply for "designation" which would include provisions to ban sales from corner shops. Only authorised retailers would be permitted to sell coals for delivery within the designated area and it would be an offence to sell any unauthorised fuel within a designated area. The definition of "authorised fuel" should be extended to include "graded coals specifically prepared and labelled which are intended for use on an exempted coal-burning appliance". Finally, we are aware that some exempted appliances and some domestic boilers burning exempted fuels also create local nuisance within smoke control areas.

xv. Effects of Repealing the Appeal Provisions of the Clean Air Act (Annex D, p's 6-7)

While few appeals had been made under the headings listed in paragraph 6 and the proposed scheduling procedure for certain incinerators and furnaces would obviate the need for appeals in those cases, the existence of the Clean Air Act appeal provisions is an added incentive to local authorities to act correctly and responsibly: they should be retained.

xvi. Extension of Statutory Nuisance Provisions to Non-Dark Smoke and Other Emission from Private Dwellings (Annex D, p 8)

Repeal of Section 16 (1)(a) of the Clean Air Act 1956 would remove an unnecessary obstacle to action in a number of occasional but sometimes seriously annoying cases. The proposal to bring fume, vapour and gas emissions from dwellings in the statutory nuisance provisions is particularly welcome. At present no statutory remedy exists to control fume and odour nuisance from oil-fired domestic heating appliances which give rise to complaint.

Smoke from bonfires is also an extensive and perennial problem. As a limited but important step in abating nuisance from bonfires we urge that clean air legislation should specifically provide for the occupier of premises to take action against another, as provided in the Control of Pollution Act (Section 59) for noise nuisance.

xvii. How to Control Illegal Cable Burning (Annex D, p's 9-13)

The proposed amendment to Section 1, Clean Air Act 1968 will permit much more effective control of the problem of scrap cable burning. As Section 78 Control of Pollution Act has produced few problems with proof of "intent", the two powers of control would provide the necessary framework for action.

While the reference to arrest powers contained in the Police and Criminal Evidence Act 1984 is a useful reminder to local authorities to seek police help where these activities are prevalent and enforcement meets with obstruction, we consider that the use of police on the lines indicated would be generally ineffective. We are advised that cable burners tend to use false names and addresses, being often of no fixed abode. Hence, without powers of arrest and powers to seize the cable the problem will not be resolved.

xviii. The Control of the Contents of Fuel (Annex B, p's 14-15)

The proposal to introduce a power to control the content of fuels, similar to those in Section 75 and 76 of the Control of Pollution Act 1974, is consistent with the objective of up-dating the legislation. The powers to be granted must be carefully defined, including the use of the term "synthetic".

xix. Various Amendments to Part 3 of the Public Health Act 1936 (Annex B, p 17)

This is an excellent set of proposals. The procedures in the Control of Pollution Act 1974 have been proved to strike a satisfactory balance between effective local authority action and fairness to the defendant. Without such procedures, it is difficult to imagine how local authorities would have managed to cope with the huge increase in noise cases in recent years. The definition of "effluvia" to include smell should be carefully drafted.

xx. Restricting the Ambit of Section 100 of the Public Health Act 1936 (Annex D, p 18)

Given the enactment of the new consent procedures, the amendment of Section 100 as described in the final sentence of paragraph 18 should not present problems. The power to seek an injunction in cases not covered by the two stated circumstances should be retained so that the exceptional occurrence of wilful non-compliance with the law may be dealt with by the most stringent powers available to the Courts. An adequate long-stop will remain for use in the most extreme cases of widespread public nuisance under Section 222 of the Local Government Act, 1972, which empowers a local authority to seek an injunction under Common Law in the interests of its residents.

The retention of Section 100 or its equivalent is essential as a weighty measure to deal with recalcitrant offenders. Local authorities require powers to act where firms attempt to spin out legal proceedings for years rather than install effective abatement plant.

xxi. Repealing ''Offensive Trades'' Provisions and Setting up an Arbitration System for Non-Schedule Animal Rendering Plants (Annex D, p's 21 & 22)

While the new provisions may lengthen the abatement process we accept that the proposal to remove prior consent and bye-law control of non-scheduled ''offensive trades'' is complementary to the provision for scheduling the others; there is thus no justification for the retention of special procedures. The provision of an advisory system to assist with problem-solving is a practical proposal but it cannot masquerade as an arbitration service; arbitration must remain with the Courts.

Recommended additions to the list of offensive trades at Annex C to the Consultation Paper are at Annex A to this submission.

xxii. Extending Local Authority Powers to Control Urban Pests (Annex D, p 23)

The proposal to extend Section 74 of the Public Health Act 1961 to include urban pests is welcomed.

D. OTHER COMMENTS

Resources

The proposed changes will impose considerable additional workloads for HMIAPI (which currently lacks the resources to meet adequately its present commitments, let alone embrace the additional tasks proposed). As to local authority environmental health departments, existing works and processes transferred to Schedule B cannot be subjected to new BPM or improved BPM controls until the works or processes are substantially altered. This will require considerable input to ensure the maintenance of existing standards and emission controls and to persuade them to improve standards pending the opportunity to enforce BPM.

We seriously question the statement in paragraph 15 that ''the proposal should not involve significant additional costs'' and equally question the arbitrary figure of £0.5 millions per year as the additional cost to control authorities. Both our industrial and local authority members are unanimous that the resource allocation proposed is totally inadequate and that the overall legislative package could prove a disaster without the provision of adequate funding including backup expertise.

The introduction of the new legislation is an essential and long overdue requirement and should not be inhibited in any way. We strongly urge that the adequacy of the resources currently proposed should be reconsidered as a matter of priority.

Crown Immunity

The Consultation Document makes no reference to the continuing and currently intractable problems posed by emissions from NHS incinerators. We challenge the statement that "Crown Immunity does not imply lower standards".

While it is true that the Secretary of State has powers under the Clean Air Acts, he will only act on the representation of a local authority that *serious* infractions of the Acts have occurred and continue to occur.

The local authority currently has to prove that any infraction concerning a Crown Premises is in fact an exemplary case. The preparation of a representation which will have any likelihood of being accepted by the Secretary of State entails long hours of observation and discussions with the occupier of the Crown Premises over a very long period of time, meticulously recorded and supported by evidence, very much in the manner of a prosecution, until eventually the representation is prepared and sent off for consideration by the Secretary of State. The process can take months, even years, with the distinct possibility that the Secretary of State after wide consultations, mainly with the occupiers of the Crown Premises, will decide on a course of action which falls far short of what the local authority may consider necessary. In the meantime, the infractions continue unabated.

Under the National Health Service (Amendment) Act 1986 the immunity of health authorities in relation to the Food Act 1984 and the Health and Safety at Work etc Act 1974 is removed. We urge that Crown incinerators and heating plant should be brought under the same rules as food through repeal or amendment of Section 22 of the Clean Air Act 1956.

Other Omissions from the Consultation Document

The Consultation Document has not addressed the following outstanding air pollution problems:

- vehicle emissions; specifically their possible joint control by police and the local authorities;
- the requirement for specific controls on crematoria emissions;
- problems raised by legal tipping and litter dumping.

We look forward to a full discussion on these issues with a view to appropriate provision for their control being included in this round of legislation.

Emission of Dark Smoke from Industrial Chimneys (Annex A, p 3)

Contrary to the statement in paragraph 3 of Annex A, the emission of dark smoke from industrial chimneys is NOT prohibited! In fact, the Dark Smoke (Permitted Periods) Regulations specifically permit the emission of dark smoke, subject to specified limits. We strongly recommend that the time is now opportune to repeal the Dark Smoke (Permitted Periods) Regulations.

We note also an error in paragraph 4 of Annex A. Smoke from chimneys in Smoke Control Areas is NOT prohibited. It is controlled subject to specific circumstances and to specified exemptions and these provisions do cause problems, eg with oil or solid fuel fired central heating boilers in smoke control areas.

Annex B — Part B

Additional processes to be controlled by local authorities:

- Hydrocarbon fume emissions from stenter plant in the textile finishing industry should be included.
- Furnaces under local authority control range of 5-50 MW is too limited: the range should be extended to 150 MW as under the Chimney Heights Memorandum
- Roadstone manufacturers (mineral works) have potential for severe nuisance. Local authorities are well placed to respond quickly to complaints regarding air pollution and noise, and consideration should be given to early transfer of sole authority for these works to competent local authorities.

JD and JL
27 March 1987

ANNEX A List of Offensive Trades — Proposed Additions

Fish Meal Handler
Pet Food Manufacture
Chocolate Manufacture
Chocolate Manufacture
Bituminous Products
Treatment of Intestinal Mucosa for Pharmaceutical Processes
Oil Refining
Animal Manure Drying and Processing
Drying of Miscellaneous Agricultural and Industrial Produce
Crab Boiling
Poultry Cooking
Instant Coffee Manufacture
Stoving of Plastics
Barrel and Drum Cleaning
Manufacture of Antibiotics by Fermentation
Seaweed Processing
Colour Printing on Web and Sheet Presses
Textile Printing
Coated Wallpaper Manufacture
Soapmaking and Manufacture of Certain Odorous Chemical Compounds
Tobacco Manufacture
Swill Boiling
Maggot Breeding
Poultry Housing
Piggeries

REVIEW OF THE BUILDING REGULATIONS NSCA RESPONSE

NSCA comments mainly relate to health and building regulation, and are arranged as follows: A. General; B. Air quality; C. Products of combustion; D. Sound; E. Conservation of fuel and power.

A. GENERAL

1. Simplification of the Building Regulations and a greater degree of flexibility in their application are laudable aims, provided that, overall, standards are maintained and improved where necessary. We highlight in our response the urgent need for sound insulation requirements to be applied to converted flats. However, standards of sound insulation achieved in new built flats and houses under existing Building Regulations are far from satisfactory, as evidenced by comments from our local authority members and as demonstrated by BRE research.

2. Regarding indoor air quality, a more positive encouragment of natural ventilation in homes is needed, and we welcome the intention to balance this requirement with the need to conserve energy (fuel and power).

3. Documents supporting this response are the papers by Gregory, March and Squirrell, presented at the NSCA Workshop on Indoor Air Quality, 25-26 March 1987, and the NSCA's 2-part Report on Sound Insulation in Flat Conversions (Part 1 pub. June 1986, Part 2 pub. January 1987).

B. AIR QUALITY

4. We endorse the need to preserve adequate air quality in dwellings and other buildings occupied by people. A proper balance between thermal insulation, ventilation and avoidance of condensation is essential. Improved guidance in these areas would be most welcome.

5. We have some difficulty in interpreting the statement in paragraph 41 that, "a sufficient quantity of oxygen for the occupants should be provided without any requirement in the Building Regulations". Sufficiency of oxygen would not be available in an unventilated room containing an unflued combustion appliance which has been burning for some time. Designed improvements in draught prevention, elimination of open fire places, provision of solid floors etc all aggravate possible problems in this respect, as do the DIY activities of building occupiers who block air vents etc to create an even more tightly sealed indoor environment.

6. Research on radon levels in dwellings, conducted by the NRPB, has culminated in the publication of data on excessive levels which have been shown to present real health risks. Action is proposed in the case of certain existing dwellings and logically the Building Regulations should be amended to cover new builds in areas at risk. We support the relevant proposals.

7. In support of the comments in para 42, we are pleased to enclose copies of available papers from the recent NSCA Workshop on "Indoor Air Quality – Acceptable Standards

and Building Design".

8. We agree that the recommendations outlined in para 40 should help to improve indoor air quality but observe that occupiers of buildings should be made aware of the threat to air quality posed by an over-zealous attention to draught exclusion, by certain furnishings and heating/cooking appliances, and by smoking. People cannot be relied upon to open windows sufficiently to ensure adequate air changes, unless they are made aware of the health problems associated with indoor air pollution. Perhaps another section within DOE might take responsibility for ensuring that the public is adequately advised in this respect.

C. PRODUCTS OF COMBUSTION

9. We regard it as essential that provisions to ensure adequacy of combustion air and removal of the products of combustion are preserved. We have previously noted indoor air pollution problems associated with direct fired air heaters used in industrial and storage buildings.

D. SOUND

10. We welcome the recognition (page 2 para 9 and page 9 para 47) that noise is an important health hazard and therefore that part E on sound insulation should be retained. We also welcome the proposal to examine the extension of part E, to cover sound insulation in flat conversions. However, we are sure that it is not sufficient at this stage simply to be "considering" the matter. We believe that positive proposals should be put forward now relating to sound insulation in flat conversions. The need is clearly demonstrated both on the grounds of protecting the health of all sections of the community as equally as possible, and in the light of the findings of the NSCA's report on this subject (enclosed).

11. We agree that there is a clear need to enable new technology to be applied in this field and we support the proposal for approving alternative ways of demonstrating compliance (para 49b). However, because under the Building Regulations the requirement is simply to certify the plan, we wish to sound a warning that even an extended laboratory test will still be more akin to the laboratory than the field situation and there can be no guarantee that workmanship on actual buildings will match the laboratory construction standards. We consider that the insulation required to pass the new test procedure should be higher than that required for normal field tests, to cover the workmanship factor. We further suggest that random testing by the local authority of new development should be encouraged, with the cost being passed on to the developer.

12. With reference to para 49(a), we assume that the Department of the Environment will be sending out for consultation the new draft approved document. We welcome the intention behind para 49(a), but would point out that constructions other than some concrete floors also present difficulties.

13. We strongly support the principle, expressed in paragraph 50, page 10 line 3-2, that something is better than nothing. We commend to your attention the NSCA report on

sound insulation in flat conversions, Part 2. This document provides what might be the essence of a first draft of a section relating to flat conversions in a new approved document: see in particular chapter 3.

14. We wish to express our concern about any proposed inclusion of the phrase "attainable at reasonable cost" in relation to sound insulation in flat conversions. If it is accepted that good sound insulation is required for health reasons then it is appropriate that the same standard should apply to all dwellings, whether purpose built or converted.

15. We note and approve the bringing into line of the English and Scottish Building Regulations.

16. Consideration should also be given to layout, as this optimises constructional benefits, although we recognise that it is not possible to guarantee that eg a bedroom will always be used as a bedroom. We would also draw attention to the need to upgrade stud partitions used as separations between common areas and emphasise that here also consideration to design and layout is essential.

17. We are aware that sound insulation structures may be particularly susceptible to deterioration and this peculiarity should be borne in mind in relation to paragraph 81.

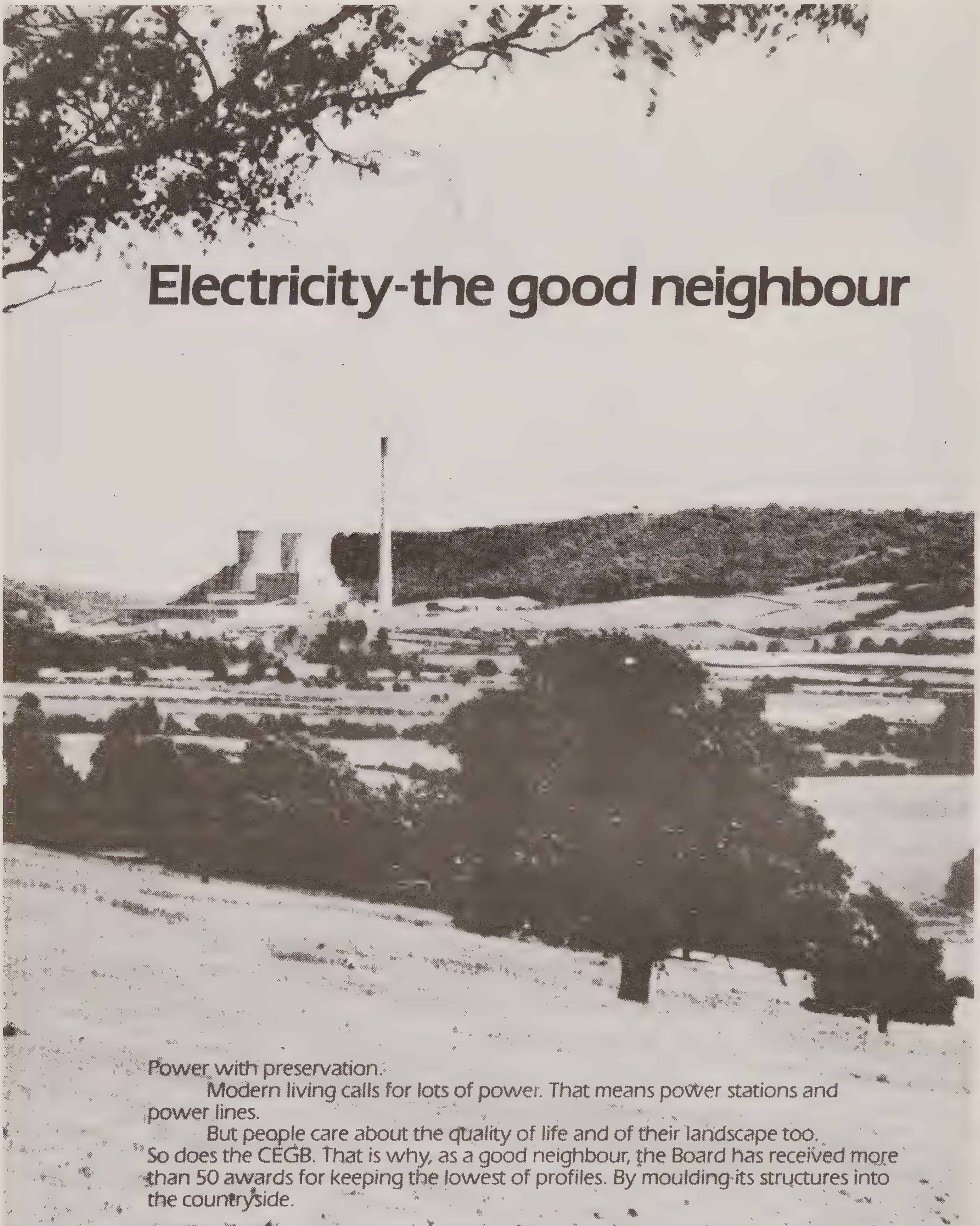
18. We should make it clear that Part 2 of the NSCA Report on Sound Insulation in Flat Conversions was written in the light of the situation prevailing in 1986, ie with no specific coverage of sound insulation in flat conversions by the 1985 Building Regulations. That report therefore recommended a range of standards appropriate for planning conditions. We do not see this policy as transferable to the Building Regulations. While in some conversions physical conditions may prevent the adoption of approved techniques to meet the performance standard, the document should be so worded that compromise on a minimum standard of sound insulation is not an option for converted dwellings.

E. CONSERVATION OF FUEL AND POWER

19. We support the proposal to recast Part L requirements as a simple functional requirement that reasonable provision shall be made for the conservation of fuel and power in buildings, with guidance provided in an approved document. We see it as important that such a requirement be balanced by attention paid to adequate ventilation.

20. As to industrial and storage buildings, we acknowledge the problems of condensation referred to in para 63. However, the deletion of requirements regarding conservation of fuel and power in such buildings could be a retrograde step. The "reasonable provision" requirement should not prove an impossible one for designers of such buildings, providing that the guidance in the approved document is less specific as to insulation levels and energy targets for industrial and storage buildings than in the section for domestic buildings.

NOTE: The above statement of NSCA views will be more comprehensible if read in conjunction with the original consultation document circulated by the Department of the Environment. Readers may obtain a copy from The Editor, *Clean Air*.



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Reader Enquiry Service No. 8717

INDOOR AIR QUALITY: ACCEPTABLE STANDARDS AND BUILDING DESIGN

Report on the 1987 NSCA Workshop by
Jane Dunmore

The NSCA's 1987 Workshop was a departure from the norm, looking at pollution indoors rather than outdoors, although as several speakers pointed out, air interchange ensures that gases and particulates emitted outdoors penetrate the indoor environment. But it was principally the pollutants generated within buildings which excited most concern and discussion. Biocides in soft furnishing and carpet backings, the range of noxious products from cigarette smoke, and all the problems encompassed by the fascinating umbrella term "the sick building syndrome" were the focus of speakers' and delegates' attention.

Building design changes spark concern over health

Dr. Derek Gregory of the Building Services Research and Information Association gave an excellent scene-setting presentation at the beginning of the Workshop, looking at changes in building design, use and ventilation and highlighting the design sources of some of the current problems with a very experienced practitioners' eye.

Buildings today are generally designed for greater warmth and comfort than in the past but some of the modern services, together with current trends in ventilation rates linked to energy conservation measures, are trapping pollutants indoors and preventing the intake of fresh air. As a result, the air quality indoors may be below what our health requires.

It is hard to single out particular presentations for attention since they were all, in their different styles, fascinating and most informative.

Human interest

I found Dr. Ching Aw's paper on *Exposure to Perchloroethylene from Dry Cleaning Establishments* of great human interest. As NSCA Chairman Ivor Barker pointed out, solvents from dry cleaning premises have been a problem for 20 years or so and with the pressure on accommodation today people frequently live above dry cleaners. Dr. Ching Aw showed that both installation and maintenance of ducting in these establishments is often totally inadequate for the task of safely extracting the solvent emissions and venting them away from the workplace and nearby homes. Dr. Aw's team from the Institute of Occupational Health at Birmingham University examined in detail 33 people living above 16 dry cleaning establishments to assess their exposure to and absorption of perchloroethylene. About 30% of the individuals revealed symptoms consistent with the effects of organic solvents and when environmental sampling was done indoors, the team found that in six cases levels of perchloroethylene in the air in homes above these dry cleaners exceeded accepted safety standards.

This presentation linked in nicely with the one by Dr. Jean Monro on chemical hypersensitivity. Dr. Monro is a specialist in acute reactions to what may be regarded as normal environmental loads of chemical substances. She screened 171 of the patients attending her clinic over a period of 3 months for sensitivity to ambient levels of chemicals in air, food and water. On the basis of her results she concludes that about 25% of people, throughout the population, may have hidden sensitivity to one or another "trigger" compound – one in four of us contains a genetic time-bomb waiting to go off! The overload may be caused by an exposure to a very low concentration of a toxic substance such as perchloroethylene, or by an intolerance to the combination of pollutants in typical urban atmospheres.

Passive smoking

Passive smoking is now recognised to be a a real health threat, albeit of a lower order than active smoking. By the time Mike Squirrel had described the multitude of nasties lurking in sidestream cigarette smoke, I was resolving never to step into a "smokers' " railway carriage again and, as a reformed smoker, blushing with shame for the evils of my past habit. The health risks obviously depend on exposure conditions, especially ventilation rate and length of exposure, but both to avoid irritation to eyes, nose and throat *and* any long-term health risk, Mr. Squirrell advocated meaures to protect the health of non smokers and smokers alike, which received general support from the audience.

Sick building syndrome

Turning from what makes people sick to what makes a building sick, Dr. Tony Pickering of the Wythenshawe Hospital in Manchester and Roy Waller, Environmental Consultant, both had fascinating if slightly different answers. Dr. Pickering's conclusions were based on studies carried out over four years in offices around the country. Dr. Pickering found a number of complaints associated with air conditioning systems and his first avenue of enquiry was to check for the presence of humidifier fever. But it turned out that where a substantial number of workers was affected, complaints were usually of headaches, excessive tiredness totally out of keeping with workload, nasal stuffiness, gritty and painful eyes, dry throats and dry skins. These symptoms were not what might be expected from humidifier fever; and, because they are all very common in the general community, Dr. Pickering found it essential to build very tight controls into his study. His team therefore looked at a range of buildings and carried out questionnaire surveys on a random sample basis. Naturally ventilated buildings performed best, although not all are good to work in; passive smoking may be the cause of various symptoms. Looking more closely at the problems in artificially ventilated buildings, Dr. Pickering's attention was drawn to the influence of artificial lighting in terms of headaches and migraine; ceiling height seemed to be an important factor. Sometimes problems can be solved by moving people closer to windows so that they get more natural light from outside. He found that temperature also appears to be crucial, as does the ability of people to have some control over their own environment.

Avoiding trouble

Roy Waller, in his "Thoughts on avoiding trouble" also emphasised the importance of giving people some means of adjusting physical systems to give them individual control of the environment indoors. He ran through a checklist of points to tackle in order to overcome the sick building syndrome, placing great stress on ensuring that complaints procedures operate effectively. Sometimes it is only through communication with the management of the building that people can have any control of their environment in modern, sealed offices. Other important and sensible advice was that different activities generate different levels of heat and if you have people doing different things at various levels of activity in the same space, they will react more or less favourably to a constant temperature.

Daniel in the lions' den

With all the talk of buildings being tighter as a result of a drive for greater energy conservation, Andrew Warren of the Association for the Conservation of Energy felt rather like Daniel in the lions' den when he got up to persuade delegates of the continuing advantages of energy conservation measures. In the event he made a very sound case, tempering his plea for us to save nationally and individually on heretofore wasted energy with an acknowledgement that people must still ensure that their living spaces are properly ventilated as well as warm. He ended with the reminder that energy conservation is not just a "motherhood and apple pie" issue but critically important for social reasons, for environmental reasons and for economic reasons. Few would quarrel with that.

Malcolm Fox looked at air quality in the very particular situation of indoor car parks. He showed how careful attention from the outset to a design aimed at ensuring good ventilation and proper flow of traffic into and out of car parks will minimise build-up of carbon monoxide, which can reach alarmingly high levels in some multi-storey or underground car parks. His points were poignantly topical in view of the "Herald of Free Enterprise" tragedy — fumes from cars also build up inside the large car decks of cross channel ferries, hence the tendency to open the bow doors to clear the deck of fumes.

The authors of the excellent guideline and datasheet publication, "Hazardous Building Materials" both spoke at the Workshop, Chris March looking at the hazardous materials and their problems in buildings, and Steve Curwell taking on the challenging task of pulling together all the strands of the Workshop presentations and discussions into some conclusive policy and practice guidelines. If you want to find out what these are — buy a copy of the 1987 Workshop proceedings!

The full set of papers and discussion reports from the Workshop will shortly be available, price £9.80 inclusive.

Since the above report was written, a new survey of building sickness has been published, by Building Use Studies Ltd and a copy has been received by the NSCA for review. A full review will appear in the next issue, but meantime, for those interested in this subject and wishing to obtain copies of the report, the full title and publication address is as follows: "The Office Environment Survey — An investigation into the prevalence of building sickness", by Building Use Studies Ltd, 14/16 Stephenson Way, Euston, London NW1 2HD. Telephone: 01-387 3332.

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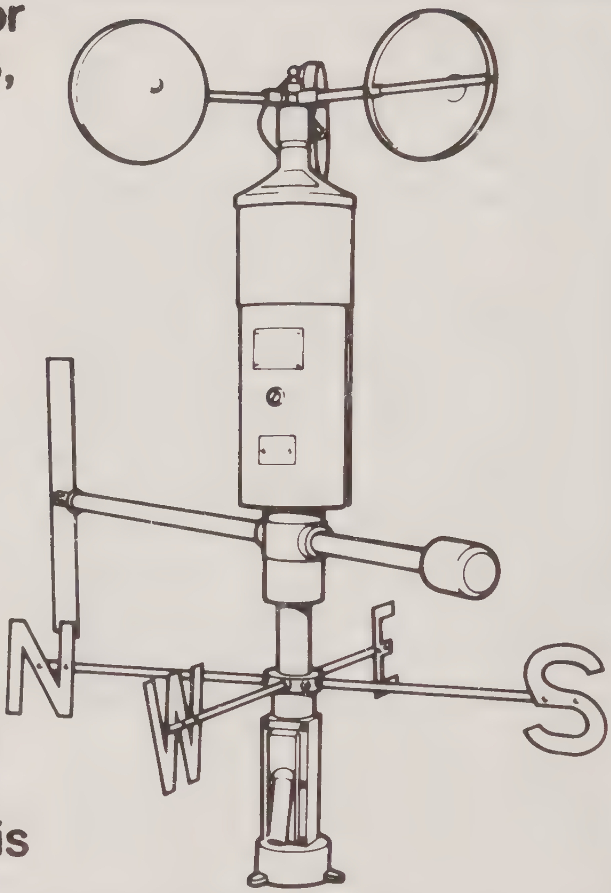

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UPDATE

ENVIRONMENTAL PROTECTION TECHNOLOGY SCHEME

In April 1986 the Environmental Protection Technology scheme was launched as a major new drive to encourage the development of cleaner industrial technologies. The EPT scheme is aimed at securing a partnership between government, industry and the pollution control authorities, to identify priority areas where investment in research and development is most needed. The intention is to provide a further necessary stimulus to innovation and investment in research and development in pollution abatement technology in the UK.

An environmental protection technology advisor will be appointed within the Department of the Environment to organise the scheme in close co-operation with Warren Spring Laboratory. The scheme will be directed by a management group with members drawn from government, the pollution control authorities and industry.

The EPT scheme falls into three main parts: *information assembly and appraisal,* bringing together information about clean technologies, equipment and standards in the UK and abroad and assessing the opportunities for further R & D; *setting priorities* — in partnership with industry and pollution control authorities for areas where support for R & D should be focussed; and — *measures to encourage research and development* in the identified priority areas. Developments in priority areas will be encouraged through publicity and through pump-priming funds. The latter will apply in cases where there is an insufficient natural pool of money from the market to get a worthwhile R & D project off the ground. Selected proposals will receive up to 25% funding, or 50% in the case of collaborative ventures. £½ million will be available for such funding in 1987/88 and possibly £2 million per annum thereafter.

MEMBERS' HANDBOOK 1987

The 1987 edition of the *NSCA Members' Handbook* was published in June and has been circulated to all members and subscribers. This is the first year in which much of the text has been published from word processed (computer) output. We hope that this helps to improve appearance and legibility. Entering so much information onto disk entailed an extended preparation period this time, but should ensure that the editing task is far more streamlined in future. Thus, we hope to return to our springtime publication for the 1988 issue.

You will notice that, for ease of access, Handbook pages are headed by section as well as page numbers. Detailed contents of the various sections are listed at the front of the book. The Handbook is divided into two parts — the first half giving NSCA information, and the second comprising statistics (or smoke control), and directories of environmental organisations, environmental films and teaching aids, consultants, and environmental equipment manufacturers.

Further copies of the NSCA Members' Handbook may be purchased from the NSCA, price £7.25 per copy.

Correction

May we draw readers' attention to one important amendment to the Members' Handbook 1987. It is much regretted that the photographs of Mrs. E. Warnock and Mr. A.G. Ward have, inadvertently, been transposed on page 59. Our apologies are offered to both these Members of Council.

UPDATE OF EH40 – EXPOSURE LIMITS FOR TOXIC SUBSTANCES

The Health and Safety Executive have updated their Guidance Note on occupational exposure limits. The new Guidance Note, *EH40/87 – Occupational Exposure Limits 1987,* includes some important changes from the 1986 edition. There are new control limits for 4 glycoethers commonly used as solvents, for ethylene dibromide – an anti-knock agent in petrol, for hydrogen cyanide, and for rubber process dust. There is also advance notice of new or intended changes to 31 Recommended Limits. Copies of the Guidance Note are available from HMSO or book sellers, price £3.50 (ISBN 0 11 883940 3).

OZONE AND HEALTH – VDI GUIDELINES

The VDI Commission on Air Pollution Prevention, comprising experts from science, industry and administration in the Federal Republic of Germany, has published new guidelines on *Maximum Immission Concentrations for Ozone and Photochemical Oxidants.* These guidelines are usually a preliminary to new laws, regulations and administrative instructions in the field of air pollution prevention in the FRG. The guidelines on ozone, in a dual German/English text, are available on loan from the NSCA Library. They cover general biological effects of ozone, results of animal experiments, observations in man, and the limits proposed by the VDI.

Another new VDI publication is entitled *Dispersion of Emissions by Accidental Releases – Safety Study.* This again is a dual German/English text and presents a computational method of estimating the dispersion of emissions by accidental releases on the basis of the Gaussian dispersion equation. This publication is also available on loan from the NSCA Library.

EMPLOYMENT IN NEW ENVIRONMENTAL ACTIVITIES

The European Commission has proposed a five-year programme of pilot projects aimed at exploring the job-creation potential of schemes linked to environment protection. The Commission believes that by the year 2000 some 3 million people could be employed in new environmental activities.

The scheme, estimated to cost about £24 million over the first 3 years of the programme, would be complementary to work undertaken by another Community funds, such as the regional or social funds.

Projects would vary from a few jobs to several hundred, with the cost per job ranging from under £4000 to over £100,000. The Community contribution would average 40% of the project costs. Small businesses and cooperatives in particular are expected to benefit from the scheme.

The job creation/project development scheme is an integral part of the Fourth Environment Action Programme, the keynote of which is prevention of pollution. Projects proposed for support under the scheme should be innovative and should avoid duplication of schemes already in hand through other Community Programmes. However, they will not be limited to assisted areas and are intended to cover a field of activity that could lead to a pooling of experience.

The draft Decision (COM(86)721, of 2 March 1987) gives a list of the criteria to be used in the selection of projects. These include the innovation element, the contribution it could make to environment policy, how many jobs it will create, the cost, who will co-finance the project, and whether the experience will be transferable to other countries or areas.

Figures published by the European Commission show that in 1980 the environmental industry throughout the Community involved one and a half million jobs and this number is expected to rise not only as a result of specific encouragement given by project funding, but due to the increased demand for technological controls posed by new legislation formulated at EEC level.

NEW AUTHORISED FUEL

Regulations made under Section 11 of the Clean Air Act 1956 have declared Calco Cosycoke be a fuel authorised for use in smoke control areas in England and Wales. The fuel is manufactured by the Cooperative Wholesale Society Limited. (Reference: *SI 1987, No 625 – Clean Air, the Smoke Control Areas (Authorised Fuels) Regulations 1987.*)

IMPACT OF CHERNOBYL

The National Radiological Protection Board has published the first complete assessment of the effects of Chernobyl on Europe. This report, funded under a contract from the Commission of the European Communities, uses environmental monitoring data from the whole of Europe to assess radiation doses to the EC population. The data was acquired during the month after the accident and further estimate of the impact of the reactor accident was based on calculations made using mathematical models of radionuclide transfer through the environment. Nevertheless, there are still significant uncertainties in parts of the assessment and the results presented in the paper* should therefore be regarded as preliminary.

The results show that the lowest average doses were received in Spain and Portugal, and the highest in West Germany, Italy and Greece. The average dose in the UK is 50 microsieverts – about one tenth of the figure for West Germany. For comparison, the average dose each year from natural background radiation in EC countries is 1000-2000 microsieverts; 50 microsieverts is about the dose received from cosmic rays on a return journey by jet aircraft to New York.

About 60% of the dose throughout Europe has already been received. The rest will be received at a declining rate over coming decades. However, some individual doses were substantially higher than the average figures; a few people in areas of high deposits of radioactivity (eg where high rainfall occurred during the time when the plume was over Britain) received doses above 1000 microsieverts – similar to a whole year's natural background radiation dose. Doses in parts of West Germany and Greece reached 2000-4000 microsieverts.

Because of the presence of radioactive iodine in the deposit, the doses to thyroids, especially of young children, were up to 10 times those for the whole body.

Over the next 50 years it is estimated that 30 million people in EC countries will contract "natural" cancers, while extra cancers due to the Chernobyl accident are predicted to be in the order of 1000. It will therefore be impossible to detect the health impact of the accident.

**A preliminary assessment of the radiological impact of the Chernobyl reactor accident on the population of the European Community, M. Morrey et al, NRPB 23 March 1987 (CEC Report).*

30% PROTOCOL ON SULPHUR EMISSIONS – EEC ACTION

The Commission of the European Communities has issued a proposal aimed at ensuring Community-wide implementation of the Helsinki Protocol which provides for a 30% reduction in total SO2 emissions by 1993. The Protocol has been open for accession since 13 July 1983; while it has been signed by 7 Member States (Belgium, Denmark, France, Italy, Luxembourg, The Netherlands, Federal Republic of Germany) it has so far been ratified by just 3 Member States (Denmark, France, The Netherlands). The Commission believes that accession by the Community as a whole to the Helsinki Protocol would be a first important step in a programme of Community action aimed at further reductions in the longer term, particularly in large combustion plant emissions.

The proposal (COM(87)67 – 16 March 1987) is, first, to approve on behalf of the whole of the EEC the text of the Helsinki Protocol and, second, to deposit the instrument of accession with the Secretary-General of the United Nations.

TRANSBOUNDARY AIR POLLUTION – EFFECTS AND CONTROL

The UN ECE has published another report within the framework of the Convention on Long-range Transboundary Air Pollution. This, entitled *Air Pollution Studies 3 – Transboundary Air Pollution – Effects and Control*, was published in New York in 1986 and covers technologies for controlling NOx emissions from mobile sources, an update review of effects of air pollutants, and studies of effects of sulphur compounds and other air pollutants on soil and on ground water. A copy of the report is available from the NSCA Library.

IEHO CALL FOR FURTHER ACTION ON ACIDIC EMISSIONS

The IEHO Environmental Protection Committee has criticised the scale of measures announced by the government to reduce UK power station emissions, declaring that the decision to retrofit 6000 MW of existing generation capacity with flue gas desulphurisation equipment between 1988 and 1997 is insufficient.

Chairman of the Committee, Graham Jukes, said that the programme would only affect three power stations to which it is understood higher sulphur coals are likely to be directed. He considered that the measure would not satisfy the membership of the Institution, which approved a motion at its 1985 AGM calling for the government to formally join the "30% Club".

NEW COAL FIRED POWER STATIONS

The Central Electricity Generating Board is to seek planning permission in 1987 for at least two new coal-fired power stations. The Board has selected sites at Fawley on Southampton Water, and West Burton in Nottinghamshire. The Board has already had consultations with the local authorities in each area which will continue before the formal planning applications are submitted later this year.

Site investigations are also continuing at 3 other sites — Kingsnorth in Kent, Killingholme in South Humberside, and Hams Hall in West Midlands. All three sites are to remain options for later applications by the Board, together with Inswork Point in Cornwall, Marchwood in Hampshire and Barking in London.

As to nuclear stations, following the government's decision to approve "Sizewell B" nuclear power station, work is in hand to enable the CEGB to make a planning application for a follow-on pressurised water reactor (PWR) nuclear station at Hinkley Point in Somerset.

The decision to go ahead with two major new coal-fired power stations was welcomed by Sir Robert Haslam on behalf of British Coal. The CEGB is the coal industry's biggest and most valuable customer, and the planned station at West Burton will use coal from the Nottinghamshire coalfields while the one at Fawley will require coal to be shipped in, possibly through Immingham. Each power station will burn nearly five million tonnes of coal a year. Both will presumably be subject to new requirements from HM Inspectorate of Pollution, including measures to limit SOx and NOx emissions.

PROPOSAL ON THE SULPHUR CONTENT OF LIQUID FUEL

Agreement is expected soon on the proposal for a Council Directive, amending Directive 75/716/EEC, on the approximation of the laws of the Member States relating to the sulphur content of certain liquid fuels. This would lower the maximum permitted sulphur content of gas oil (derv and gas oil used for heating) from 0.5% to 0.3% and would permit Member States suffering from serious pollution to require the use of gas oil with a lower 0.2% maximum sulphur limit.

Subject to the resolution of the circumstances in which Member States can impose the lower 0.2% limit, negotiations on the draft are well advanced, and the UK regards the text as satisfactory. Gas oils in the UK account for little more than 2% of the total sulphur emissions and the government does not see the need to make use of the facility to impose the 0.2% limit in the UK.

EEC PROPOSAL ON SPEED LIMITS

The Commission of the European Communities has put forward a proposal for the Community to adopt legally-enforceable speed limits taking account of construction and traffic volume in motorways, environmental factors such as pollution emissions and noise, and the acceptability of limits.

Large-scale tests carried out on German motorways show that speed limits of 100 kilometres per hour would reduce NOx emissions by approximately 10%. Another, less exhaustive test also in FRG showed that a speed limit of 120 kilometres per hour would reduce NOx emissions by 7%.

LEAD FREE PETROL — NEW EEC PROPOSALS

The Commission of the European Communities has put forward a proposal to allow Member States to prohibit the marketing within their territories of 2 star (regular) leaded petrol. This would mean that small petrol stations would not have to install extra pumps and storage tanks for the unleaded regular fuel, with savings of approximately £17,000 to £28,000 for each pump and tank. Regular leaded petrol, which commands only 13% of the UK market, is anyway expected to be displaced through market forces as unleaded petrol is introduced.

The 1985 Directive allows for the marketing of leaded premium and leaded regular fuel. By 1 October 1989 Member States must ensure the availability and balanced distribution of the premium fuel but as it stands the Directive also allows another leaded grade with lower octane numbers to be marketed. For a large number of petrol stations it will be physically and financially difficult to stock two types of leaded and two types of unleaded petrol. A high proportion of modern cars which use low-octane regular petrol can run on either leaded or unleaded petrol; even vehicles which need lead in the fuel to avoid excessive engine wear can actually run quite satisfactorily using leaded petrol only once in every three or four tank fills. This means that drivers can use the less polluting lead-free regular petrol for 75% of the time, switching to leaded premium grade for the other 25%. Given that unleaded premium fuel is required to be supplied under the EEC Directive, and that unleaded regular will eventually come onto the market, the leaded regular fuel is not technically necessary and hence the EEC proposal to encourage its phasing out.

Reference: Proposal for a Council Directive amending Directive 85/210/EEC on the approximation of the laws of the Member States concerning the lead content of petrol (COM(87) 33 final, 2 April 1987).

In the UK, the Chancellor of the Exchequer announced in March 1987 the creation of the 5p tax differential between leaded and unleaded petrol with the aim of assisting the petroleum companies to meet the additional cost of producing lead-free petrol and thus enable it to be sold at a price no higher than the leaded fuel. However, there is still a need for a widespread public education campaign to let drivers know which existing cars will run on lead-free petrol, what modifications are required by other cars in order that it can be used, and where to buy the lead-free fuel. And, as a result of the failure of EEC countries to reach accord on the proposal for further automobile emissions reduction, there is still no Directive requiring car manufacturers to produce vehicles to run on lead-free petrol, although a high percentage of new cars coming off the market are technically capable of using it. Of existing cars on the road, it is estimated that about 10% are capable of running on lead-free petrol.

DEADLOCK ON VEHICLE EMISSIONS CONTINUES

EEC environment ministers gave special attention to the proposals on vehicle emissions reductions at their meeting in March 1987. Despite the Luxembourg agreement on 27 June 1985, there has been little progress since. That agreement proposed a two-step reduction in emissions, with a first move lowering limit values to CO:45 g/test; HC + NOx: 15 g/test; and NOx: 6 g/test, with effect from 1 October 1989 for new models and from 1 October 1995, to bring Europe in line with limits currently in force in the USA. The new limits then would be: CO:10-35 g/test; HC + NOx: 2.6-8.2 g/test; NOx: 1.1-4.0 g/test.

The Environment ministers agreed in March 1987 to help Greece over pollution in Athens, but Denmark is still holding out with its block on the proposed Directive, as it considers the first stage of emission reductions to be too weak. Meanwhile, the British government has been concerned to ensure that any agreement should not preclude the further development of lean-burn engines, which technology, it claimed, should save the European motor industry hundreds of millions of dollars in reducing exhaust emissions.

BLOOD LEAD MONITORING RESULTS

Results of blood lead surveys carried out in 1986 for the Department of the Environment show a continuing fall in blood lead levels. Compared with 1985, blood leads of children surveyed fell by about 1.5 μg/100 ml (16% reduction), levels of police officers on traffic duty by about 2 μg/100 ml (18% lower) and those of other adults sampled by about 1 μg/100 ml (10% lower). This decline in blood lead levels clearly reflects the reduction in the lead content of petrol, which from January 1986 was cut by two-thirds, to 0.15 grams per litre.

RSC FORMS TOXICOLOGY GROUP

The Royal Society of Chemistry has formed a Toxicology Group to increase knowledge concerning the safety of chemicals. The Group's discussions, chaired by Professor L.J. King of the University of Surrey (past Chairman of the British Toxicology Society), will range over issues such as effects of agrochemicals on soil and water; mechanisms of toxic action — eg chemical reactions which may induce cancer; risks in the workplace, the environment and the home; and toxicology in relation to radioactive materials.

The new Group is to liaise with the British Toxicology Society in this work.

LETTER FROM NEW ZEALAND

From Mr. Patrick Neary, Secretary, New Zealand Clean Air Society Inc.

Dear Friends,

A brief report on progress in New Zealand. We continue to press for proper operation of smoke control, particularly in Christchurch where it is urgently needed. We recently contacted some 300 local bodies advising them of the problems of woodburning closed stoves, and improper operation of solid fuel heaters generally.

There has been a reduction in the lead content of New Zealand's high octane petrol and we hope our publicity has had something to do with this. We also appointed a representative to the Wellington conference on the protection of the ozone layer, and I continue to represent the Christchurch City Council on the Air Pollution Committee of the Canterbury United Council. We hope to persuade that body to authorise an advertising campaign of S50,000 for this years' clean air publicity. However the "User Pays" philosophy is uppermost here at the present time!

The approval of closed stoves for use in New Zealand has been a complete fiasco. The originally agreed test procedure for certifying appliances, dating back to 1968, has proved to be totally ineffective. We told the government-sponsored Clean Air Council 20 years ago (both through official channels and wide publicity) that the appliances would be a failure. There have been thousands installed, even in Clean Air Zones; the only improvement has been a reduction in SO2 because so much wood is being burnt. Christchurch has a very high rate of cot deaths and we are concerned that the closed stoves might be creating a high rate of "indoor" pollution. However, we are reluctant to publicise this issue because of the pain it causes those who have lost babies. We do point to the dangers of cigarette smoking, but feel that parents cannot be blamed for the general winter air pollution.

A strange situation is developing in Christchurch. A study by a Dr. Scott, entitled "Air Pollution in Christchurch: How much is too much", was published recently under the aegis of the Canterbury United Council. This report concluded there was a danger to health from air pollution in winter in Christchurch. Unfortunately, the local Health Authorities have spent weeks working out a rebuttal, saying in effect that there is no serious threat to health, but that the air pollution merely constitutes a nuisance. I should be most interested to correspond with anyone who can offer helpful advice or helpful information on this point.

We think you are doing a great job.

Yours sincerely,
Patrick Neary

Editor's Note: Anyone wishing to offer help or information to Mr. Neary should write to: NZ Clean Air Society Inc., PO Box 2363, Chritschurch, NZ.

EUROPEAN YEAR
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DIVISIONAL NEWS

NORTHERN DIVISION

Spring Meeting of the Division at Capricorn Ballroom, Spennymoor on 3 April 1987

47 members of the Division were welcomed to the Leisure Centre by Cllr. R. Campion, Chairman of Sedgefield District Council. The venue was one of four such centres within the Council's area, intended to promote family and community activities with particular emphasis on providing safe surroundings. This policy he saw as being parallel to the NSCA's in protecting and improving the environment.

Cllr. Poole thanked Cllr. Campion for his hospitality. He then paid tribute to the memory of Frank Sugden, MBE, former Chief Environmental Health Officer of Middlesbrough BC, whose death had been a great loss to the Division and to everyone who knew him.

Continuing with business, Cllr. Poole said that testimony to the efficiency of Blyth Valley Environmental Health Department had come in a letter to Mr. L. Mair from a resident threatened by leakage of carbon dioxide from mine workings into local houses. This emergency, with its risk of asphyxiation, was explained by Mr. Dobson, a member of the department. It was hoped that a full presentation of the incident would be given by Blyth Valley officers to the Division at a future meeting.

Mr. B.T. Head, H.M. District Inspector of Pollution, was introduced to talk about the organisation of the new central Pollution Inspectorate and about future legislation on air pollution control. The Consultation Paper had identified four main principles: retention of BPM; a common system of control for the Inspectorate and for local authorities; a system of consents; and improved public access to information. In addition, EEC legislation would require greater involvement at all levels in ensuring, for instance, that the Framework Directive for combatting air pollution from industrial plants was met.

The new Inspectorate of Pollution was structured with a Director at its head, overseeing the Chief Inspector — Radioactive Substances, the Chief Inspector — Air, Water and Wastes and the Administration Unit. The Air Water and Wastes Division itself was divided three ways into: Air Division East, Air Division West and Waste & Water Division.

The discussion following Mr. Head's talk covered problems experienced by local authorities with existing rather than new plant and the difficulty of agreeing "best practicable means". Mr. Head assured the meeting that the local inspectorates would be as active as ever and aim to provide the best possible service to local authorities.

Mr. R. Lander, Chief Environmental Health Officer, Middlesbrough Borough Council, thanked Mr. Head for elucidating such an important subject and praised the part played by the NSCA in advocating the return of the Inspectorate to the Department of the Environment. He commended the Society's response to the Consultation Document as essential reading for all members *(see this issue).*

W.C.B. Robson
Honorary Secretary

EAST MIDLANDS DIVISION

Some sixty members signed in at the Pavilion, Buxton, on the 2nd April, 1987 when the Division was hosted by the High Peak Borough Council. After chatting informally over coffee, kindly served on arrival by our hosts, members were called to order by the Divisional Chairman, Mr. J.L. Fear, who then introduced the Mayor of High Peak, Councillor L.E. Proctor.

In extending a Civic Welcome to the delegates Councillor Proctor referred particularly to the Society's involvement with noise problems and said that he felt everybody was entitled to a reasonable quality of life. He was delighted to be invited to join in the day's proceedings. Thanking the Mayor, Mr. Fear said the Division was pleased to have the opportunity to meet in Buxton.

After the business meeting, the Chairman introduced Mr. Martyn Bayley, one of the Environmental Health Officers of the High Peak Borough Council, who gave a well illustrated report on the investigation of a nuisance caused by goods trains at a local quarry. Introducing his talk with a recording of the noise of a passing train, Mr. Bayley said that the quarries in question had the largest face in Europe. There had been agreement to use rail transport rather than heavy goods vehicles and special wagons had been designed. Unfortunately, at one point on the track where there were dwellings in fairly close proximity, problems had arisen due to low frequency noise.

Mr. Bayley described the painstaking investigations, including a good many night-time measurements, which were required to identify the particular wagons responsible for the offending noise. This also involved in-depth argument of certain features with British Rail acoustical experts concerning both cause and remedy. When the problem had been fully appraised there followed further representations to British Rail culminating in the service of a notice under Section 58 of the Control of Pollution Act 1974. After initial resistance the length of track concerned was eventually replaced by the welded type.

At the conclusion of the talk Mr. Bayley dealt with a number of questions. Thanks to Mr. Bayley both for his efforts and for an interesting paper were expressed by the Chairman. Members then took lunch which was very efficiently served in the Pavilion dining room, before embarking by coach to the Tunstead Quarry of ICI Limited.

On arrival at the Quarry, members were given background information about the limestone industry and shown an educational video entitled "The Big Hole". This was followed by a tour of the quarry and processing plant.

The thanks of the Division are due to the Mayor and Borough Council of High Peak and also to the management of ICI Limited for all the facilities offered in making a successful meeting.

E.F. Raven
Honorary Secretary

BOOK REVIEWS

Our Common Future – Final Report of the World Commission on Environment and Development. Oxford Paperbacks (OUP), £5.95. (ISBN No: 0-19-282080-X)

The World Commission on Environment and Development presented its final report to the public on 27 April 1987. This, the result of a 3-year dialogue between politicians and scientists from five Continents, is intended to cover economic and ecological development beyond the year 2000.

In her forword to the publication, the Chairman of the Commission, Norway's Prime Minister Gro Harlem Brundtland, said that the challenge was to secure long-term environmental strategies for achieving sustainable development, and in the process to encourage greater cooperation among nations at all stages of development and an understanding of each other's aspirations and problems. The aim was to put forward realistic proposals which would not bankrupt the resources of future generations.

The report, said to be one of the most important documents of the 1980s on the World's future, is indeed a very worthy tome, comprehensive in its scope although inevitably far from detailed in its analysis of specific issues. For example, the section on atmospheric emissions from fossil fuels covers just 7 pages into which are compressed climatic change, acidification, and the more local impacts of air pollutants. There are no startingly new data but there are some useful figures on damage and control costs of air pollution – three paragraphs drawing on US and Japanese sources. The World Commission recommends that where actual or potential threats from acidification exist, sensitive areas should be mapped and forest damage assessed annually with soil impoverishment analysed every five years according to a regionally agreed protocol. In its conclusions on future action in relation to the atmospheric environment, the report points out that the onus lies with no one group of nations. All may suffer from releases of carbon dioxide and of gases that react with the ozone layer, and all must play their part in changing damaging trends.

Another interesting section in this book deals with nuclear power and the possibilities of safe development of electricity generation by this means. In the context of the NSCA's own review on this subject, this is well worth reading and highly recommended. The conclusion is that the generation of nuclear power is only justifiable if there are solid solutions to the presently unsolved problems to which it gives rise.

Garner's Control of Pollution Encyclopedia – Butterworth Law Publishers Limited, £110.00 (Two Volumes)

This impressive compendium, edited by Professor J.F. Garner et al, has been updated to 1987. This, the 24th issue, published in February 1987, provides the legislative texts covering all aspects of environmental pollution, divided into different sections eg waste on land, pollution of the sea, atmospheric pollution and pollution by noise. The second volume deals first with radioactive and other hazardous substances and then provides sections on forms and precedents, administrative provisions and then a most useful section on EEC legislation and documents, giving the texts to December 1986 of all Council Directives and other relevant EEC documents. The two volumes are presented in sturdy binders with room for updating sheets and the whole idea of the publication is that after the fairly hefty initial investment, it can be kept always up to date by adding the appropriate inserts.

Each issue highlights important new developments at the beginning of the book; this year the editors draw attention to the formation of the new Pollution Inspectorate, cautioning that its strength hardly seems sufficient for the task. Reference is also made to the latest acid rain moves, and to the announcement that on 1 October 1986 the whole of the City of Birmingham became subject to operative smoke control area orders.

The real value of this publication lies in the reader's ability to refer quickly to the actual text of primary legislation, regulations and orders covering all the various aspects of environmental management. With the updating facility readers will never be more than a few months out of date in their information (although I have not spotted the 1985 model Bye-Laws on burning of straw and other crop residues in this issue) and it is particularly useful to have all the EEC texts drawn together in one volume. The Encyclopedia not only complements other books published by Butterworth, but would sit well on the bookshelf beside our own *NSCA Reference Book* which reviews the legal requirements in summary.

Environmental Law by David Hughes, published by Butterworth, 1986, at £14.95 (paperback) (ISBN No: 0-406-01691-71)

This is a very different text from the encyclopedia reviewed above, being an informed commentary on environmental law, citing case histories throughout and showing clearly how the law is related to policy. The assessment of the relationship between policy-making at UK and EEC levels is especially useful and the author (who appears to enjoy the subject of his book) makes a thorough assessment of the obligations that the UK has under international and EEC law. There are also interesting excursions into the history of the Department of the Environment and the current responsibilities of other ministries and departments which have a bearing on environmental policy.

In the discussion of Common Law (the tort of nuisance), which is soundly common-sensical, David Hughes points out that not only is nuisance action costly, but even where individuals do perceive that they have right to pursue environmental issues through the Court as individuals, most lack the time, inclination and energy to involve themself in such action. And where damage is caused by a major industrial undertaking, the private citizen will be psychologically predisposed to be overawed by the size of the opposition. In that context, your reviewer notes with pleasure the formation of the UK Environmental Law Association based at the Centre for Energy and Natural Resources Law at Southampton University. The Association's first Chairman is Richard Macrory. This Society has often noted the need not only for excellent and comprehensive written commentaries on the law, such as David Hughes' volume provides, but also for specialist legal advice to be available in individual cases.

Meanwhile, the NSCA will be all the better equipped to give informal guidance to members of the public with *Environmental Law* on its shelves.

Environmental Impact Assessment: A Training Guide
Occasional paper 18, by N. Lee, 1987, published by Department of Town and Country Planning, University of Manchester.

People with limited experience of environmental impact assessment who may still have to put it into effect or teach courses on the subject will find this new paper a useful training tool. It provides guidance on the nature and scope of EIA, preparation of suitable training programmes and courses, how to undertake key tasks in the EIA process, and gives detailed guidance on the content and methodology of courses, particularly those which are learner-active. References to literature and other sources of information are also included. The paper is available from the Department of Town and Country Planning, University of Manchester M13 9PL, price £4.00 including post and packing (airmail despatch £2.00 extra).

Another recent publication from the same source is *Occasional Paper 19*, edited by P. Wood and N. Lee, entitled "Environmental Impact Assessment: Five Training Case Studies". This again is directed to lecturers and trainers in EEC Member States. It covers five case studies which each contain factual information on a particular project, listing tasks for trainees to undertake with guidance for trainers. Four of the five case studies relate to "real world" projects and the 5th has been constructed on the basis of realistic data. This paper, costing £5.00 including post and packing, is available from the Manchester University address quoted above.

Handbook of Air Pollution Analysis — Second Edition, Edited by Roy M. Harrison and Roger Perry, published by Chapman and Hall (1986), £42.50.

A second edition of the Air Pollution Analysis Handbook has appeared, this time edited by Roy Harrison of the University of Essex (who spoke at the NSCA 1987 Workshop) and as before by Roger Perry. This book, which we previously recommended as an excellent source of reference particularly in its discussion of sampling and analytical techniques, is now enhanced by a discussion of air pollution meteorology by Dr. David Moore and an extra section on air pollution chemistry, by A M Winer.

BOOKS RECENTLY RECEIVED

The brief reviews below are to draw readers' attention to some excellent books recently received for review, which for space reasons we are unable to comment upon in detail. I hope that the following summaries will be enough to whet your appetite and to enable you to get hold of any books that interest you.

Title: Acid Rain
Author: Fred Pearce
Publisher: Penguin Books Ltd
ISBN No: 0-14-052380-4
Publication Date: March 1987
Price: £3.95

Using evidence gathered during the last five years the author — News Editor of *New Scientist* — looks at the causes of acid rain, its impacts and the urgent steps which should be taken now to reduce acid deposition and the associated damage to the natural and built envionment.

Title: Acid Rain and Dry Deposition
Author: Larry W. Canter
Publisher: Lewis Publishers Inc
UK Distributor: John Wiley and Sons Ltd
ISBN No: 0-87371-016-9
Publication Date: 1986
Price: £45.95

This book contains a summary of published information available in the mid-1980s, covering general information on acid rain, atmospheric reactions, atmospheric models, long-range transport, effects of acid precipitation, control strategies, dry deposition and precipitation metals and organics. Over 800 references were identified and screened for inclusion in the book.

Title: The Aerobiological Pathway of Microorganisms
Author: C S Cox
Publisher: John Wiley & Sons Ltd
ISBN No: 0-471-91170-4
Publication Date: 1987
Price: £32.00

Aerobiology is the science of the aerial transport of microorganisms and other microscopic biological materials together with their transfer to the air, their deposition and the ensuing consequences for life forms including the microscopic entities themselves. This textbook aims to provide a background and explanation of the aerobiological pathway and of microbial survival and infectivity. It relates these to biohazards found in public health laboratories, agriculture, microbiology, genetic engineering, industry, environmental studies and space exploration. It is pertinent also to the biological control of insects and pests. The author works with the Chemical Defense Establishment at Porton Down.

Title: Aerosols – Research, Risk Assessment and Control Strategies
Authors: S D Lee, T Schneider, L D Grant, P J Verkerk
Publisher: Lewis Publishers Inc
ISBN No: 0-87371-051-7
Price: SUS 125
Publication Date: November 1986

This is a peer-reviewed work of specialists from the US, Canada, Japan and Europe, the proceedings of the 2nd US-Dutch Symposium on Aerosols, held in Virginia, USA, 1985. The focus is on air quality, welfare effects, health effects, control technologies and policy and management strategies. The treatment is in-depth and aimed at scientists and engineers.

Title: Air Pollutants and their effects on the Terrestrial Ecosystem
Editors: Allan H Legge and Sagar V Krupa
Publishers: John Wiley & Sons
ISBN No: 0-471-08312-7
Publication Date: 1986
Price: £82.75

This volume presents current research in the effects of pollutants on vegetation, soils and ecosystems. It describes the mechanisms by which pollutants act on the ecosystem components and interact with each other, as well as the latest research methods, regulatory issues, and assessments of the current state of research and future trends. Examining 9 distinct areas of pollution science, with each section containing two topical review papers and a synthesis of views on a wide variety of related topics, the approach is multi-disciplinary and accessible.

Title: Air Pollution – Third Edition, Supplementary Volumes 6, 7, and 8
Editor: Arthur C Stern
Publisher: Academic Press
ISBN Nos: 0-12-666606-7 (v. 6); 0-12-666607-5 (v. 7); 0-12-666608-3 (v. 8)
Publication Date: August 1986
Price: Vol 6 – £52.00; Vol 7 – £58.00; Vol 8 – £36.50 (sterling)

Holders of the Third, and indeed the Second, Editions of Arthur Stern's magnum opus, "Air Pollution", will be delighted to know that valuable supplementary volumes have been published to update the treatise where required. These contain data on significant developments in the science, technology and public policy of air pollution and its control in the last decade. Contributors have not repeated material contained in the original volumes, but have concentrated on providing new material relevant to today's scale of concern with issues such as acidic deposition, asbestos, carbon dioxide, indoor air pollution, stratospheric ozone, and risk assessment and management, etc. *Volume 6* is the Supplement to the earlier volumes on Air Pollutants, Their Transformation, Transport and Effects. *Volume 7* supplements Management of Air Quality, and *Volume 8* supplements Measurements, Monitoring, Surveillance, and Engineering Control. Since much of the basic information in the Third Edition is still valid, publishing supplementary volumes instead of an entirely revised fourth edition appears an excellent update solution for this essential text.

Title: Arctic Air Pollution
Editor: B Stonehouse
Publisher: Cambridge University Press
ISBN No: 0-521-33000-9
Publication Date: March 1987
Price: £30.00

Based on the presentations and discussions at the International Symposium on Arctic Air Pollution held in Cambridge, Sept. 1985, the book examines the problem of Arctic air pollution in an integral, comprehensive and multi-disciplinary fashion, an approach warranted by the considerable attention given recently in the media to the problem of Arctic haze. The book summarises existing knowledge, identifies potentially fruitful areas of further investigation and research, and raises some interesting questions for international problem resolution.

Title: Atmospheric Chemistry: Fundamental and Experimental Techniques
Authors: Barbara J Finlayson-Pitts and James N Pitts, Jr
Publishers: John Wiley & Sons Ltd
ISBN No: 0-471-88227-5
Publication Date: 1986
Price: £57.45

Taking an integrated approach to the chemistry of anthropogenic and biogenic species present as gases or droplets and particles in both the natural and polluted troposphere, the book reviews the following relevant fundamentals: kinetics spectroscopy and photochemistry, and gaseous, liquid and solid phase systems. It includes descriptions of the most important experimental techniques currently employed to obtain the database upon which the rapidly emerging field of atmospheric chemistry is founded. Finally, it discusses the basic principles behind the development of computer kinetic submodels that describe the chemical processes central to photochemical smog, acid deposition and sources and sinks of atmospheric toxics.

Title: Chemical Children
Authors: Dr Peter Mansfield and Dr Jean Monro
Publisher: Century Hutchinson Ltd
ISBN No: 0-7126-1729-9
Publication Date: March 1987
Price: £4.95

Subtitled "How to protect your family from harmful pollutants", the book first looks at the extent of chemical pollution, its effects, and why doctors have been slow to recognise these; it then looks at a wide range of particular cases which substantiate the doctors' claims, and finally sets out everything that sufferers and their parents can easily do for themselves to improve their lot.

Title: Emerging Clean Coal Technologies
Authors: Engineering & Economics Research Inc et al
Publisher: Noyes Data Corp
ISBN No: 0-8155-1098-5
Publication Date: October 1986
Price: $US 36

The book characterises and elaborates 13 emerging clean coal technologies, looking at environmental performance, technical maturity, applicability, and cost effectiveness in each case. The technologies are broadly divided into 3 fields: fuel production, energy production and environmental emissions reduction. Among individual technologies covered are coal-fuelled gas and diesel engines, fuel cells, and magnetohydrodynamics, as well as the more familiar techniques of fluidised bed combustion and flue gas cleaning methods.

Title: Energy Resources – Geology, Supply and Demand
Authors: G C Brown and E Skipsey
Publisher: Open University Press
ISBN No: 0-335-15200-7
Publication Date: 1986
Price: £10.95

Energy supply problems are matters of public and national debate and their solution depends upon understanding the different sources of energy available to us and matching these as best we can to energy requirements. The book is in two parts: the first dealing with fossil fuels and the second with non-hydrocarbon resources. Costs of energy exploitation in terms of air pollution, safe disposal of nuclear wastes etc are considered in Chapter 4. The book is based on the energy component of the Open University's course, *Earth's Physical Resources.*

Title: Environmental Tobacco Smoke
Author: Committee on Passive Smoking, Board on Environmental Studies and Toxicology, US National Research Council
Publisher: National Academy Press
UK Distributor: John Wiley & Sons Ltd
ISBN No: 0-309-03730-1
Publication Date: 1986
Price: £19.20

This book on passive smoking is subtitled "Measuring exposures and assessing health effects". It is based on an analysis of the scientific data by the NRC's specialist committee, who were charged with reviewing the chemical and physical characteristics of environmental tobacco smoke constituents, including a toxicological profile of sidestream and environmental tobacco smoke. The committee was also asked to review the epidemiological and related literature on health exposure aspects, and to recommend future exposure monitoring, modelling and epidemiological research.

Title: Guidelines for monitoring indoor air quality
Authors: N L Nagda, H E Rector, M D Koontz
Publisher: Hemisphere Publishing Corp
Distributor: Springer-Verlag
ISBN No: 3-540-17085-5
Publication Date: 1987
Price: DM 98 (approx £36 sterling)

Intended for government and private sector users and researchers, this book aims to provide the background, understanding and guidance for developing a monitoring design for specific indoor air quality assessment objectives, with at the heart of the book a step by step guide.

Title: The Handbook of Environmental Chemistry — Volume 4 Part A, Air Pollution
Editor: O Hutzinger
Publisher: Springer-Verlag
ISBN No: 0-387-09688-4
Publication Date: 1986
Price: DM 168 (approx £61.00)

This, like other volumes in the series, is an open-ended text which will attempt over the years to present a complete description of various aspects of air pollution. Most chapters are written to a fairly advanced level and should be of interest to the graduate student and practising scientist. The following topics are covered: air pollution in perspective, halogenated hydrocarbons in the atmosphere, formation, transport and control of photochemical smog, atmospheric distribution of pollutants and modelling air pollution dispersion, and the mathematical characterisation of precipitation scavenging and precipitation chemistry.

Title: Handling and Management of Hazardous Materials and Waste
Author: T H Allegri, Sr
Publisher: Chapman and Hall
UK Distributor: Associated Book Publishers (UK) Ltd
ISBN No: 0-412-00751-7
Publication Date: 1986
Price: £49.50

Describing in a practical and understandable way the manner in which most hazardous industrial materials must be handled throughout their lifecycles, the book also discusses the legal and ethical requirements involved in their use in the US. Included are all the latest data on handling and storage of PCBs, asbestos, pesticides, and heavy metals. Other sections feature analyses of hospital handling of hazardous materials and wastes, industrial resource recovery technologies, and risk assessment in establishing operating priorities.

Title: Lead, Mercury, Cadmium and Arsenic in the Environment – SCOPE Report 31.
Editors: T C Hutchinson and K M Meema
Publishers: John Wiley & Sons
ISBN No: 0-471-91126-7
Publication Date: 1987
Price: £48.95

This report has been prepared from draft contributions presented at the first SCOPE Metal Cycling Workshop held in Toronto, Sept 1984. The workshop concentrated on the four significant environmental pollutants specified in the title and found major gaps in our understanding of global and regional fluxes in all four elements.

Title: Lead Pollution from Motor Vehicles – A Select Bibliography
Compiler: Penny Farmer
Publisher: Elsevier Applied Science Publishers
ISBN No: 1-85166-066-6
Price: £25.00

In the past 10 years research into lead pollution from motor vehicles has increased substantially. This useful bibliography brings together a wide range of material on the problem including research and surveys from a number of countries. A particularly large section covers the effects of exhaust gas lead on humans, including children. In total, some 400 references are cited.

Title: Physical and Chemical Characterisation of Individual Airborne Particles
Editor: K R Spurny
Publisher: Ellis Horwood
Distributor: John Wiley and Sons Ltd
ISBN No: 0-85312-793-X
Publication Date: 1986
Price: £55.00

This book reviews the characteristics of individual airborne particles, their determination by chemical and physical methods, and their interaction with target tissues and cells in man, animals and plants.

Title: Toxic Metals in the Atmosphere
Editors: Jerome O Nriagu and Cliff I Davidson
Publisher: John Wiley and Sons
ISBN No: 0-471-82654-5
Publication Date: 1986
Price: £10.25

Highly toxic metals are now being released in large quantities into the atmosphere. This volume presents some of the most recent findings on origins, behaviour and consequences of airborne metals; their chemical characteristics and interactions; methods of monitoring metal contaminants; and ways of removing them from the atmosphere.

SPOTLIGHT

A feature section focussing on the work of other organisations

NERA (National Economic Research Association)

The National Economic Research Association (NERA) is an international firm of Consultants specialising in micro-economic analysis, serving businesses and public bodies on a wide range of issues. Founded over 25 years ago, NERA now consists of more than 175 professional staff members located across the United States and in London. Among the many services they offer, NERA has pioneered environmental economic techniques. It has assessed the economic impact of environmental control and estimated the costs and effects of legislation on prices, output and employment. It has performed numerous cost-benefit analyses of different types of environmental control and conducted comparative assessments of alternative means of achieving the same environmental results.

Last year, in association with CEED (see below) NERA produced a report entitled "The Use of Market Mechanisms in the Regulation of Air Pollution" which examined whether new forms of regulation could achieve air quality goals more economically. This report concluded that there are strong reasons for believing that a judicious blending of economic incentives with required emission standards could reduce business costs *and* improve environmental quality compared with the present position. Quoting case studies from the United States, the report suggested that savings from this kind of change might be quite substantial, and recommended that the possibilities should be fully explored in the UK.

With the continued pressures to ensure that industrial processes do not damage human health and the environment, and with the promise of more detailed regulations to emerge from both the EEC and our national government, there is likely to be ever-greater emphasis on cost-benefit analysis. Industry will certainly demand to know whether the costs of controls, in terms of higher prices, lower production and employment, are greater than the benefits likely to accrue. NERA, with its experience in making economic assessments of the impact of environmental controls on fish and wildlife, materials and vegetation, recreation and human health could help both legislators and polluters to evaluate new environmental proposals in terms of their economic effectiveness.

NERA — National Economic Research Associates — 18 Park Street — London W1Y 3WD. Tel: 01-629 6787

CEED (UK Centre for Economic and Environmental Development)

CEED is a relatively small and new body compared with some other environmental organisations. Its particular focus is on the relationship between economic analysis and environment. The organisation acts as a bridge between industry and all others with environmental concern; it is charged with overviewing matters ranging from the operation of secondary control systems in nuclear reactors, to taxation policy for softwood planting.

UK CEED grew out of the Conservation and Development Programme for the UK. Its primary focus is on the UK, but taking a wider international perspective where appropriate. CEED's task is to hold a balance and build a bridge between the interests of conservation on the one hand and the needs of development on the other. Apart from research, it holds many conferences on a wide variety of topics — biotechnology, terminology in the environmental debate, specific aspects of emission control policy, and of course on business and the environment. These events bring together research organisations, environmental groups and industry in either small, high level specialist meetings or larger gatherings addressed by expert speakers. Under its new Director, David Cope*, CEED looks set to make a substantial and unique input into the ever more crucial environmental debate.

** David Cope jointed UK CEED as Acting Director, coming to the Centre from the International Energy Agency's Coal Research Unit in London. He took over as Director from Michael Bown who left CEED at the end of August.*

ACID RAIN INFORMATION CENTRE — CURRENT RESEARCH

The Acid Rain Information Centre (ARIC) has published the third in its series of monthly reports presenting summaries of data from its investigation of the temporal and spatial variation of acidic deposition over Greater Manchester. ARIC is a research unit of the Department of Environmental and Geographical Studies, Manchester Polytechnic, and is wholely financed by the Joint Planning and Countryside Committee of the Association of Greater Manchester Authorities.

The investigation into acid deposition is intended to run for a minimum period of two years. It involves the collection of bulk deposition each week from 20 sites, country-wide. The project fulfils recommendation 4.2.10 of the United Kingdom Review Group on Acid Rain, which recommended a study of the urban influence on acidity. Each collector locates means for the determination of ambient nitrogen dioxide gas levels and the annual corrosion rate of zinc.

ARIC is coordinating a number of bodies in this work: the Environmental Health Departments of 10 Boroughs are responsible for the weekly maintenance of the collectors and conveyancing of samples to Greater Manchester's Scientific Services Laboratory, where they are subject to full chemical analysis. The results are then forwarded to ARIC where they are subjected to statistical interpretation using the PRIME mainframe computing facilities of Manchester Polytechnic.

Other results to emerge recently from ARIC, under the directorship of Dr. Jim Longhurst, are: an excellent report entitled, "Acid Deposition in the Northern Hemisphere" (February 1987) and a book of experiments for use in schools, entitled "Acid Deposition — Practical and Theoretical Educational Exercises" (February 1987).

ARIC may be contacted at the following address: Acid Rain Information Centre, Dept of Env. & Geog. Studies, Manchester Polytechnic, Chester Street, Manchester M1 5GD.

INDUSTRIAL NEWS

BETTER HEALTH FOR SICK BUILDINGS

A new service to quell Legionnaires' Disease, Sick Building Syndrome, Humidifier Fever and problems of contaminated ductwork by treating water and ventilation systems, has been launched by Rentokil.

The organisms causing these modern maladies of complex buildings develop in hot and cold water systems, humidifiers and ducts and are spread in the aerosols caused by jacuzzis, taps, showers and cooling towers.

Hotels, office blocks, factories and hospitals are sources of risk to their guests, staff, workers and patients.

Water in cooling towers for industrial processes and air-conditioning systems is often contaminated with legionella bacteria, and surveys indicate the organism to be present in 40-70 percent of hotels and hospitals. Between 1979 and 1985, 1,111 cases of Legionnaires' Disease were reported in England and Wales, resulting in 140 deaths.

Humidifier Fever produces more general symptoms including raised temperature, respiratory problems, headaches and lethargy. After a break away from the working environment, the symptoms clear, only to reappear a few hours after returning to work, hence "Monday Morning Sickness". The so-called Sick Building Syndrome involves sore throat, sore eyes, dry nose and drowsiness.

The Rentokil hygiene service carries out thorough surveys, monitors and assesses the extent of contamination, carries out thorough cleaning and disinfection of all the filters, header tanks, cooling tower sumps, repaints tank linings, proofs roof spaces and pipe ends to keep out pests, cleans overflows and plant rooms on a regular basis to establish and maintain hygienic conditions. Ventilation ducts are cleaned to remove dust and debris, birds and insects.

Not only does the service remove slime, algae, dirt and other contamination, but it enables water treatment programmes to operate efficiently, reduces the risk of infections, prolongs the effective life of cooling towers, pipes and ductwork, and cuts the risk of fire in ducting. Chlorination monitoring is also carried out and and the company has developed a new unique compressed air dust removal system for ventilation ducts.

Free advice on the Water and Ventilation Systems Hygiene Service is available from Rentokil Hygiene, Felcourt, East Grinstead, West Sussex RH19 2JY.

Reader Enquiry Service No. 8720

CONVERSION PROCESS TO MAKE TRANSPORT FUELS

British Coal have signed a collaboration agreement which will enable the German mining company Ruhrkohle AG Essen (represented by Ruhrkohle Oel und Gas GmbH Bottrop) to participate in British

Coal's £36m coal liquefaction project at Point of Ayr, Clwyd, North Wales.

The plant aims to establish the technical viability of the process and will be capable of converting 2.5 tonnes of coal a day into petrol, diesel and aviation fuels. The project is already receiving financial support from the European Economic Community and the agreement with Ruhrkohle, which is one of the major European hard coal mining and energy companies, reinforces the European nature of the project.

Ruhrkohle will have the right to increase their participation in the future and to license technology when it becomes commercially viable. At the outset, their funding is 5 per cent of total project costs.

As a result of this inclusion of an independent partner, the UK Department of Energy have confirmed that they will be supporting the project with funds amounting to about £3m in total.

Work on the site alongside Point of Ayr Colliary began in January 1986 when Fairclough Engineering Ltd undertook a £1.2 million contract for civil engineering work and buildings construction. The £10 million main plant construction contract was let to Simon-Carves Ltd and work is due to be completed this year.

The British Coal process is based on liquid solvent extraction and was developed at their Coal Research Establishment, near Cheltenham. The scaling-up of the successful laboratory process to a fully-operational pilot plant processing 2.5 tonnes of coal a day is an essential step towards an engineering design from which commercial plants — virtually coal refineries — processing several thousand tonnes a day could be developed.

Direct liquefaction of solid coal produces substances rich in aromatic compounds suitable for reforming at low cost using standard oil refinery techniques. That could mean future demand for transport fuels being met by coal-derived hydrocarbon liquids as refinery feedstock.

The process will have a high yield of products per tonne of coal because the process has little or no by-products, apart from ash. Traditional gasification or synthesis routes produce paraffinic products which have a much lower commercial value.

A major objective of the pilot plant is to prove the process's ability to operate continuously by re-cycling its solvent, itself derived from the feedstock. Other processes require added solvents which cannot be re-cycled.

Reader Enquiry Service No. 8721

FOSTER WHEELER ENERGY AND FLAKT AB IN JOINT BID FOR CEGB's FLUE GAS DESULPHURISATION PROJECTS

Foster Wheeler Energy Limited is collaborating with Flakt AB of Sweden to produce feasibility studies on Flue Gas Desulphurisation systems for power stations in the UK. This is in response to the CEGB's decision to retrofit FGD equipment to three 2,000 MW power stations initially.

The CEGB has invited a number of groups within the power supply industry to submit competitive studies designed to assess the suitability and performance of retrofit plant on the second half of the Drax power station in Yorkshire. The contract for this plant is due for award in 1988 with the other stations following in successive years.

The Foster Wheeler/Flakt team is offering two separate, but well proven, technologies as part of its contribution to the studies – the Flakt/Niro *spray-dry* FGD process and the Flakt/Peabody *wet* (limestone/gypsum) FGD process.

The Flakt/Niro spray-dry process

The process treats the flue gases with a slurry of slaked lime to capture sulphur oxides and form a dry product. Whilst this approach involves the use of more costly feedstock, the plant is simpler and cheaper to construct. Numerous applications for the dry solid product have been found in the construction industry. The technology was originally developed by Flakt Industri in Sweden and Niro Atomiser in Denmark and is used in power stations throughout the world.

The Flakt/Peabody wet process

The Flakt/Peabody wet process has been exclusively developed by Peabody Process Systems of Norwalk, Connecticut, a division of Flakt Inc, and applied extensively throughout the USA. The process contacts the flue gases with a limestone slurry to produce calcium sulphite for oxidation into specification gypsum or a stable solid byproduct. Plants are operating using this system burning coals with similar chlorine levels to those in the UK coals. Plants can be designed for zero liquid effluent discharge.

If awarded the contract, Foster Wheeler Energy (using Flakt technology) would manage, engineer, procure and construct the plants through its Power Systems Division, which is based in Reading. Flakt involvement would be coordinated through its UK subsidiary Flakt Limited of Staines. British labour, materials and equipment will be employed wherever possible.

Reader Enquiry Service No. 8722

LODGE-COTTRELL BID FOR CEGB CONTRACT

Lodge-Cottrell of Birmingham, who have been supplying power stations with pollution control equipment for more than fifty years, believe they have the optimum solution to the CEGB's FGD requirement. Lodge-Cottrell is offering two separate schemes, both now under detailed review by the CEGB.

Attention is very much centred on the Flue Gas Desulphurisation (FGD) system which uses limestone to absorb sulphur dioxide and produces a commercial quality of gypsum. Lodge-Cottrell is offering the Saarberg-Hoelter process which represents the latest "limestone/gypsum" technology and currently takes a large share of the active West German market. Saarberg-Hoelter pioneered the use of organic additives to improve absorption efficiencies to well over 95% and to minimise limestone consumption. They have also pioneered the revolutionary "stackless power plant" concept – this technique of ejecting cleaned flue gases through cooling towers saves the major expense of gas reheat systems and eliminates the need for a chimney. Currently, four West German power plants are adopting this approach for 15 desulphurisation systems.

The alternative system offered by Lodge-Cottrell, a division of Dresser UK Limited, is its Spray Dry process developed entirely in the UK Technical Centre in Birmingham. This major development project, with special design features for this application, is the only truly 'home-grown' product available. The Lodge-Cottrell Spray Dry System represents a lower capital cost alternative with no liquid discharge streams, and produces a dry powder "throw-away" product.

Reader Enquiry Service No. 8723

NEW LABORATORIES OPEN AT THE UNIVERSITY OF BRADFORD

Two brand new analytical laboratories were opened at the University of Bradford in April 1987: **The Perkin-Elmer Demonstration Laboratory** and the **Environmental Science Laboratories.**

The Perkin-Elmer Demonstration Laboratory is the result of a highly successful piece of University/industry collaboration. Perkin-Elmer, the Beaconsfield-based manufacturer of state-of-the-art analytical instrumentation, has decided to base its Northern Demonstration Laboratory at the University of Bradford. The Laboratory will be used to demonstrate the latest Perkin-Elmer scientific instruments to potential customers from all over the North of England. The University was chosen because of Bradford's easy access via the motorway network in the North of England, and because the company is seeking to strengthen its ties with the academic, industrial and research communities. At the same time, University scientists will benefit by having access to this advanced equipment, both for teaching and research purposes. It is hoped that in the future, a joint approach can be made to research and development in environmental analysis problems.

Environmental Science Laboratories

A new suite of laboratories has been developed in the University's School of Environmental Science. These comprise (1) a main trace element laboratory and services; (2) an applied ecology laboratory and offices; (3) an instrument room with preparation/decontamination room. Conversion of the laboratories, housed in the University's Phoenix Building (previously a woollen textiles mill), amounts to approximately £100,000, with an additional £75,000 for equipment and apparatus.

The result is an analytical unit capable of undertaking a wide range of analyses, both of metals and non-metals, using wet chemical methods on environmental samples.

With this much increased potential for inorganic analysis, the School of Environmental Science is now in a position to undertake environmental investigations in co-operation with central and local government, as well as with industry.

Reader Enquiry Service No. 8724

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CLEAN AIR

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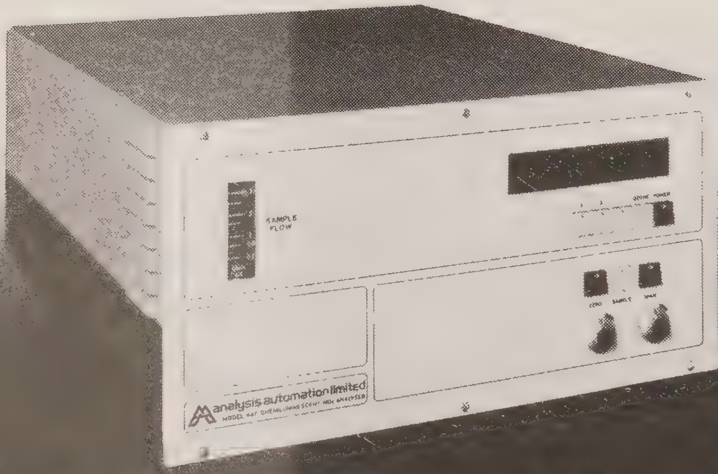

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CLEAN AIR

THE JOURNAL OF THE NATIONAL SOCIETY FOR CLEAN AIR

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NSCA DIVISIONS

For administrative and electoral purposes the Society is divided into geographical Divisions as follows:

1. Scotland; 2. Northern Ireland; 3. Northern; 4. North West; 5. Yorkshire and Humberside; 6. West Midlands; 7. East Midlands; 8. Eastern; 9. London and South East; 10. Central Southern; 11. South West; 12. South and Mid Wales.

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Telford,
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and Eastern Division:
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Corporation Street,
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Brent NW2 6EA
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South West Division:
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Woodspring District Council,
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Griffithstown,
Pontypool,
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THE CHANGING FACE

Our system of air pollution control is in a state of metamorphosis unparalleled since the Clean Air Acts which this Society fought to bring about. Not only has the European Community become a driving force in determining policy on pollution but our approach to prevention is changing too. With the new unified Inspectorate now firmly under the roof of the DOE, the Best Practicable Environmental Option philosophy is undergoing practical trials at selected sites. In this issue, Ivor Barker – Immediate Past Chairman of Council – reflects on its implications for the NSCA, its goals and potential pitfalls.

Sadly, primary legislation to implement the DOE's Consultation Paper proposals has not been possible this year, owing to lack of Parliamentary time. The October conference accordingly provided a timely opportunity for DOE to explain what will happen now. Neil Sanders of the Air Quality Division assured a packed hall that activity was continuing apace with some of the proposals being implemented by Regulation, hopefully in the spring of 1988. Future consultation papers are to be circulated on the detailed schedule of Part A and Part B processes and these should be put out soon.

The success of this year's Conference was apparent in the numbers of delegates attending individual sessions and the high level of participation. New faces were to be seen as the Society welcomed its new President, Lord Nathan, and congratulated other familiar faces on new appointments. Ken Dunn is our new Chairman of Council and there are three new Honorary Secretaries of Divisions: Keith Horton for the South West, Ken Kelly for Yorkshire and Humberside, and Geof Kaufman for the North West (though Geof has been in post for quite a while now). Details can be found in the New Appointments section.

At the beginning of August, the Headquarters staff said goodbye to Jane Dunmore, my predecessor as Editor of Clean Air, and Information and Press Officer for the Society. In wishing her well in her new career as a freelance Communications Consultant, we also welcome Tim Brown, our new Information and Press Officer.

All that remains is for the HQ staff – old and new – to wish all readers a very happy New Year.

Penny Gilbert
Editor

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Reader Enquiry Service No. 8728

THE PRESIDENTS ADDRESS

Given by **The Rt. Hon. Lord Nathan, MA, FSA, FRSA, FRGS, President of the NSCA,** *at the 54th Annual Clean Air Conference on 26 October 1987.*

Practitioners

Let me say first that it is a great honour to hold the office of President of this Society, which has over so many years been in the forefront of environmental concern and action. Its membership largely consists of practitioners of environmental control and regulation and it is a good corrective for a person such as myself, accustomed to the somewhat remote atmosphere of the Royal Commission and of the Select Committee in the House of Lords. It is very easy to become dissociated from reality in these ethereal spheres and this Society, I hope, will bring me down to earth and keep me firmly there.

Distinguished predecessors

And this brings me to Councillor Poole, my predecessor, who, as a Councillor, has been in the forefront of practising the art of controlling pollution. His long service to the Society lends distinction both to the Society and to himself and I count it a great honour to have been elected President having none of those qualifications.

It is, of course, also an honour to hold the office in succession to so many distinguished predecessors, some of whom are old friends, for whom I have the highest admiration. I am thinking of Lord Ezra, who was Chairman of the Coal Board and did so much to improve the environment, particularly by seeing to the landscaping of slag heaps, which desecrated the countryside. And then there was David Williams, now happily also a Vice President, who is President of Wolfson College, Cambridge and the next Vice Chancellor; serving on so many commissions and committees, in addition to his writings as a leading authority on administrative law, he has done much to advance modes of thought on environmental matters. And then, rather further back in time, there was Lord Flowers, whom I have had the privilege of knowing well over the years, a former Chairman of the Royal Commission and currently Vice Chancellor of London.

John Evelyn

The badge with which I was invested today bears the portrait of Evelyn who wrote, in the seventeenth century, a tract upon the pollution by smoke of London and who, as I understand, devised a form of stove for burning coal somewhat similar, and perhaps equally effective, to that now adopted in smokeless zones. He was a man in advance of his time and I am proud to wear this badge, not only because it signifies my Presidency of the Society but also because it bears the portrait of Evelyn. I myself was concerned to a degree with historical pollution in London, because many years ago I was Master of one of the City Guilds, the Gardeners' Company, and part of our uniform is to carry a bouquet of sweet smelling herbs to keep off all offensive and noxious odours. You may note that we still carry them.

Commission on Energy and the Environment

I first became concerned with environmental matters as Chairman of a Working Party, formed in 1973, on Energy and the Environment. It was on that working party that I first met Admiral Sharp, who was then Secretary General of this Society and who now holds the magnificent title of Emeritus Director General of the International Union of Air Pollution Prevention Associations. One of the recommendations we made in that report was that there should be a Standing Commission on energy and the environment and, in the fullness of time, the Commission on Energy and the Environment was formed under the chairmanship of Lord Flowers. It produced a monumental report on Coal and the Environment. The day after publication the Commission was put into abeyance. It is rare, from my experience, that one serves on a committee whose recommendations are put into effect in one's lifetime. It is, I think, unique to find a recommendation has been implemented and disimplemented in so short a time.

The key factor, which emerged from our working party and which was adopted by Lord Flowers' Committee as the cornerstone of their Report, was that a policy for the development of resources must be created in the context of its environmental and social consequences and that protection of the environment cannot be separated from the other objects of a policy for energy. Skirmishes between environmental interests and energy interests benefit neither side and over the past ten years or more integration of industrial and environmental policy has become a guiding principle.

Lead in the environment

I learnt a lot from undertaking that first study in 1973. I learnt much too from our study of lead which resulted in the Ninth Report of the Royal Commission. It was CLEAR, a brilliantly led pressure group, which raised public consciousness over lead levels in the environment and that is why the Royal Commission undertook the study of lead urgently. What we found was that lead was rapidly accumulating in the environment, that the burden of lead was becoming far too heavy and the accumulation should be reduced; secondly the margin of safety, that is the difference between actual levels of lead in air and those known to cause damage, was far too narrow and far narrower than for other toxic substances; and thirdly that substantial improvement could be achieved quickly and without great economic cost by eliminating lead from petrol. We made a recommendation to that effect at 2.30 pm one day and at 3.30 pm that same day the Government accepted our recommendation, surely a record to be compared with the seven years that elapsed between our recommendation about air pollution and its acceptance by government.

The role of pressure groups

The experience shows that pressure groups, well led, can produce results. Generally their members are ordinary people who join from bewilderment and fear: bewilderment about the impact of new products, the new found dangers of familiar things and the speed of change and fear of the resultant dangers. That is why, when novel products and new concepts come forward, which hold promise of enormous benefits, those benefits and the risks and dangers associated with them must be examined openly with full public participation. Scientific data and assessments must be publicly available for examination, probing and testing. It is not good enough, nor is it acceptable, for those in authority to pursue the line of "we know best".

A unified approach

The methods of regulating environmental pollution have inevitably been central to my experience, both as a member of the Royal Commission and as Chairman of the House of Lords Environment Sub-Committee of the Select Committee on the European Communities. It has always struck me as extraordinary that pollution of air, water and land are not only regulated differently but according to different principles with different objectives.

The central approach to pollution control, demarcation between pollution of land, air and water and the application of different principles and practices to each is surely no longer acceptable. The range of scheduled processes is confined to those producing especially difficult emissions to air. I place before you for consideration an extension of scheduled processes to those producing especially difficult discharges to water and wastes destined for disposal to land. It is ironic that the Inspectorate can and does intervene with plant and its operation in special cases of scheduled processes to minimise air pollution but special wastes arise without any control. The control is only to their disposal. The creation earlier this year of the unified Pollution Inspectorate should surely provide the spur to action on these developments.

Quiet persistence

This Society has an enviable record of achievement. It has created and fostered new ideas, new approaches to problems as they develop and new solutions and, by quiet persistence, has them adopted.

NEW APPOINTMENTS

THE PRESIDENT

The new President of the Society, **Lord Nathan,** was elected at the Annual General Meeting on 26 October 1987. Lord Nathan MA, FSA, FRSA, FRGS, has been a member of the Royal Commission on Environmental Pollution since 1979 and is a member of the House of Lords Select Committee on the European Communities, having been Chairman of its Environment Sub-Committee 1983-87.

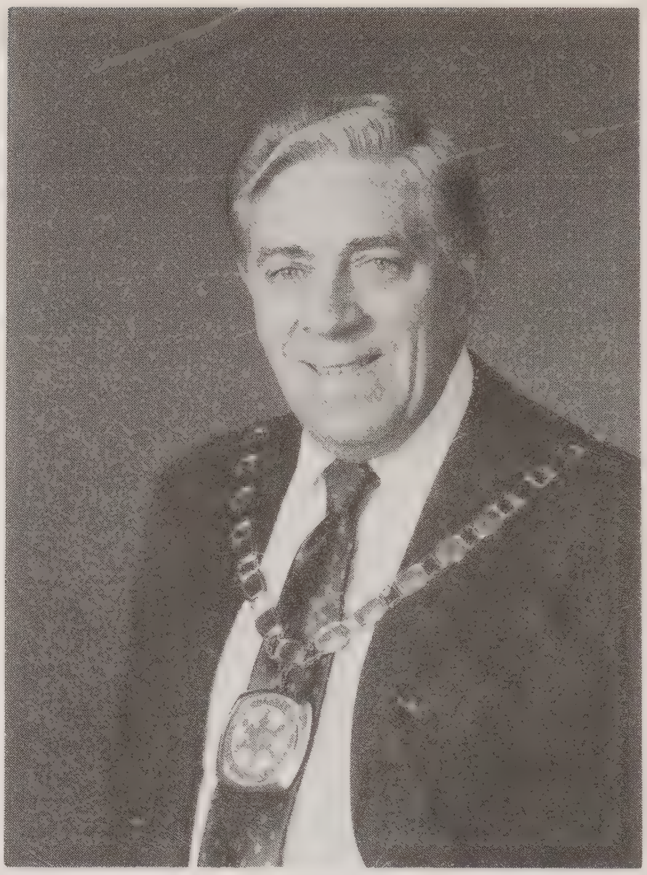
A solicitor, Lord Nathan was until recently senior partner of Herbert Oppenheimer, Nathan & Vandyk, Solicitors, London; he has been an associate member of the Bar Association of the City of New York and of the New York Lawyers Association for many years. He is President of the newly formed UK Environmental Law Association and a founder Council Member of the Common Law Institute of Intellectual Property.

Lord Nathan is a Vice President of the Royal Society of Arts (Chairman 1975-77 and subsequently Chairman of its Environment Committee). He has written a number of publications and addresses on Environment and Charity Law and Practice.

Lord Nathan takes over the office of President from **Cllr. Len Poole, BEM, JP,** whose sterling work for the Society will be well known to all its members and to which Lord Nathan paid particular tribute in his Presidential Address.

THE CHAIRMAN OF COUNCIL

Ken Dunn, CEng, MInstE, took over from Ivor Barker as Chairman of the Society's Council following his election at October's AGM. A fuel technologist, Ken Dunn is Managing Director of the Incinerator Company Ltd, which he joined in 1969. He has been a member of the Environmental Protection Equipment Manufacturers' Association since its inception in 1972 and became its Honorary Secretary in March 1973.



HONORARY SECRETARY — YORKSHIRE & HUMBERSIDE DIVISION

The newly appointed Honorary Secretary for this division is Mr. Kenneth Kelly, presently the Deputy Director of Environmental Health for Rotherham Metropolitan Borough Council, South Yorkshire. He has been in his present employment since local government re-organisation in 1974, having previously held environmental health officer posts with Doncaster MBC, Doncaster RDC and Leeds CBC. During the thirty years he has been in local government he has always been associated with the implementation and progression of pollution control in its many facets.

One of his many interests outside work is golf, and he is this year's winner of the SSFF golf tournament held at Brighton.

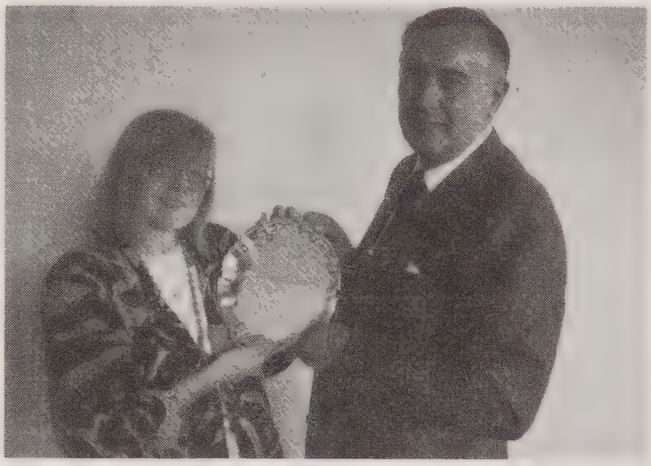
HONORARY SECRETARY – SOUTH WEST DIVISION

Keith Horton has recently taken over from Howard Nowell as Secretary of the South West Division. He is Assistant Chief Environmental Health Officer with Woodspring District Council based at Weston-super-Mare. Interest in the Society developed when he specialised in pollution seven years ago, and he has been a member of the Divisional Council for three years.

Particular interests include noise, especially vibration and more recently radiation and its monitoring. Keith has been closely involved with the Avon, Gloucestershire and Somerset Environmental Monitoring Committee of which he is currently Vice-Chairman.

PERSONNEL CHANGES AT HQ

As many readers will know, **Jane Dunmore,** who worked for the Society for more than 12 years, left us at the beginning of August to pursue a freelance career as a communications consultant. In recognition of the enormous contribution made by Jane to the work of the Society, John Langston presented her with a silver salver from the NSCA at a buffet lunch held at HQ.



The work of **Information and Press Officer** is now undertaken by **Tim Brown** while **Editorial** and **Library** matters are dealt with by **Penny Gilbert.**

8th WORLD CLEAN AIR CONGRESS · THE HAGUE · HOLLAND · 11-15 SEPTEMBER 1989 ·

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Reader Enquiry Service No. 8729

CONFERENCE REPORT

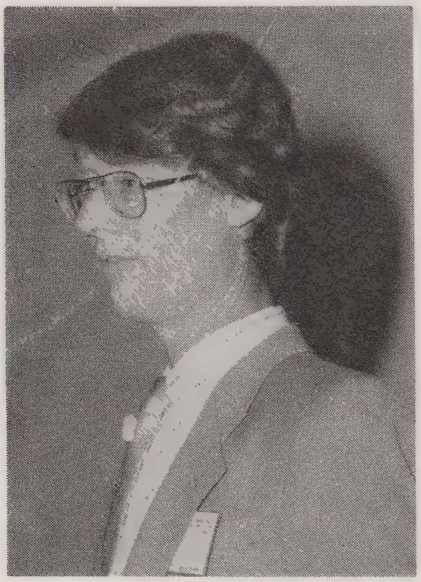
Report on 54th NSCA Conference

The Practical Approach

Lord Nathan, the Society's new President, set the tone for this year's Conference in his opening address. Of particular importance, said Lord Nathan, were the practitioners amongst the NSCA membership — those involved at the grass-roots level with pollution control. This practical interest was exemplified by Cllr. Len Poole, his distinguished predecessor, and it was the practical approach that achieved results; it ensured that the NSCA Conference — unlike some others — did not become "a rest home for the chronically articulate!"

Changing Gear

The practical side of the Government's plans for changing air pollution control legislation came under scrutiny in Session 2. With the combined Inspectorate of Pollution set up on 1 April this year, and the Royal Commission on Environmental Pollution examining the whole concept of the Best Practicable Environmental Option everything seemed in gear for change. A racing start, however, was hardly possible. Neil Sanders (Air Quality Division, DOE) confessed to disappointment that lack of Parliamentary time meant there would be no primary legislation this session but DOE would be starting down the road of Inspectorate implementation by laying Regulations on some of the proposals.



N. Sanders

"Essentially, what we are planning", he said, "is to extend the current 1983 schedule of industrial processes controlled by the Inspectorates to cover those that were proposed in the consultation paper to come under their control. Most significantly, this means municipal waste incinerators. We are also considering bringing the glass industry temporarily under the Inspectorate's control so that all the categories specifically listed in the European Commission's Framework Directive to combat air pollution from industrial sources will be covered."

Looking at Glass

Brian Douglas (St. Helens MBC) queried the wisdom of this last proposal. Since St. Helens MBC had unparallelled expertise on the glass industry — the area had the largest concentration of glass industries anywhere in the UK — the Authority could contribute significantly to discussions on BPM for the industry. Neil Sanders assured Brian Douglas that the ultimate intention was to return glass works to LA control; the first round of regulations, though, would only involve the Inspectorate.

No delay for LAs

Recognising the presence of so many practitioners in his audience, Neil Sanders turned to the implications for local authorities. In practice, he said, DOE did not anticipate the failure to gain Parliamentary time this session as delaying the date when LAs would gain prior approval powers over the full range of Part B processes.

"The Intention had been to establish an enabling power to allow local authorities to take control over part B processes incrementally. Under regulations they would be given responsibility for each process when the guidance for it has been agreed nationally after full consultation between the pollution control authorities and industry groups .... By the time the guidance is agreed, we should have the powers to allow local authorities to assume control responsibility". Soon, said Neil Sanders, consultation papers would be put out on the detailed schedule for parts A and B control, and he looked forward to an interesting debate on the merits of introducing charges for authorisations.

In Europe

Dr. Graham Bennett, (Institute for European Environmental Policy, The Netherlands) spoke about the changing nature of the European scene and what appeared to be an irrevocable shift in responsibility from the national to the European for air pollution policy-making. Europe had an impressive track-record on environmental legislation bearing in mind that the Treaty of Rome does not even mention the word 'environment'. In the new fourth Action Programme for 1987-1992, five main goals are set for air pollution control

- to identify pollutants (both outdoor and indoor)
- to determine the most appropriate focus for control instruments
- to reduce ambient concentrations to levels acceptable for sensitive ecosystems.
- to develop appropriate management techniques eg pollution modelling and monitoring networks.
- to set and implement EC-wide objectives for substantial emission reductions to combat acid deposition and forest die-back.

Dr. G. Bennett

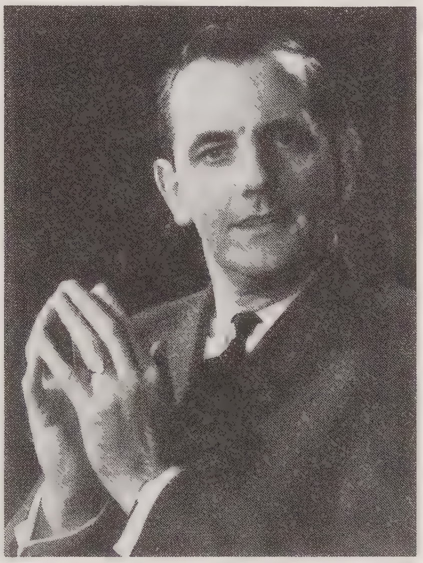
The latter, together with the question of vehicle emission controls, was at the heart of a long-running dispute between Member States.

In answer to a question from the floor,

Dr. Bennett confirmed that the findings of the Royal Society Study would probably have an effect on EEC policy on acid deposition; the second phase of reductions under the large combustion plant directive was likely to reflect the Study's conclusions.

Acid comment

Sir John Mason (Royal Society) explained in his presentation that the Study was now at mid-point and, at this stage, scientists from all three participating countries were in agreement. The Surface Waters Acidification Programme is a major research project on acid rain being carried out in the UK, Norway and Sweden under the auspices of the Royal Society and the Norwegian and Swedish Academies of Science; set to run for five years, the Programme is sponsored by the CEGB and British Coal. Sir John stressed that the sponsors had no influence whatever on the Study's findings, as his Scandinavian colleagues in the Programme would confirm. For fish, said Sir John, aluminium was the killer; leached out by acid from the soil, it destroyed the gill function. Some fish could adapt to gradual increases in acidity but could not survive the sudden flushes of acid and aluminium produced by the melting snow pack in the spring and heavy rains in the autumn which flushed accumulated acid deposits through the soil after a dry summer. Interestingly, calcium appeared to have a 'de-toxifying' effect on aluminium for fish and calcium levels were crucial in determining the survival of fish populations — a 50% drop in calcium could devastate them. It remained, said Sir John, for the Study to relate cuts in emission levels to improvement in water quality.



Sir John Mason

Monitoring

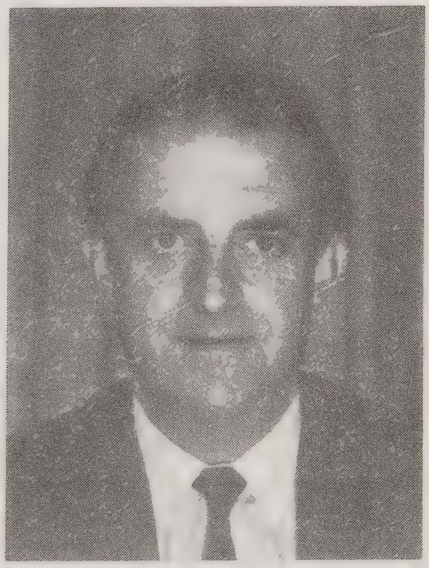
Dr. Jimi Irwin (Warren Spring Laboratory) explained how major changes had occurred in the DOE's air quality monitoring programme over the last five years. An increasing emphasis was being given to air quality in rural areas with significant increases in monitoring of ozone and NOx. In urban air quality monitoring, the emphasis had shifted from smoke and SO_2 measurements to NO_2 monitoring in order to assess compliance with the EEC nitrogen

Dr. J. Irwin

dioxide Directive. The new network for NO_2 and ozone, said Dr. Irwin, represented the first full coverage of the UK on a national basis, with telemetric data handling playing an important part. WSL was also involved in the analysis of precipitation composition for species important in the acid deposition issue. In fact all the data being collected by WSL was archived in a flexible relational database with software which allowed a wide range of analytical procedures to be carried out on the data. This meant that for the first time the UK had a centrally co-ordinated data-base on all the major air pollutants, of international quality.

Dioxins

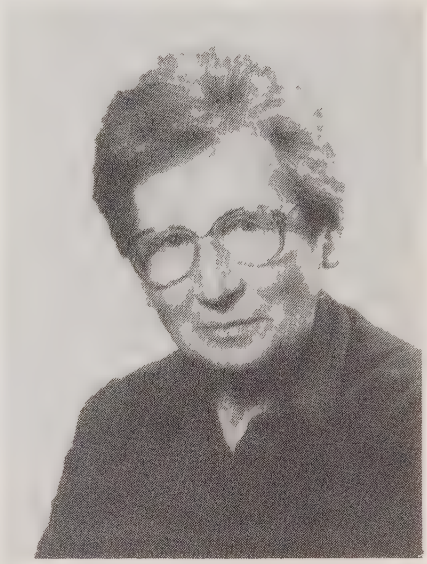
Derrick Oakland spoke on a subject of much recent concern: dioxins. The complexity of the issue had not always been apparent amid the media hype but even experts in the field were not agreed on dioxin synthesis, the significance of incineration, or the long term effects on public health. Derrick Oakland's paper, however, gave a practical account of the most recent findings and appropriate precautions. There was, he said, general agreement that emissions of PCDD and PCDF from incineration and crematoria could be reduced by high furnace temperatures and long residence times, together with high turbulence and excess oxygen levels.



D. Oakland

Transport noise

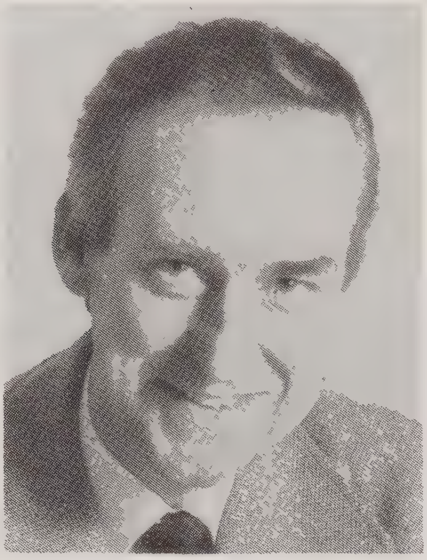
The Wednesday morning saw an interesting session on noise. Judith Lang, President of AICB (the International Association Against Noise) explained how Austria had tackled the problem of road traffic noise with low-noise trucks and "whispering asphalt" — a special quiet road surface. Helicopter noise posed specific problems and John Simson (London Scientific Services) stressed how vital it was to learn from the experience of siting airports in order to minimise problems from heliports. Early in the planning process, decisions should be made on an acceptable heliport noise environment for the area and, more specifically, an acceptable noise exposure boundary. Paul Lattimore (Consultant) gave delegates sound practical advice on mounting a survey of transport noise which would give the most accurate results.

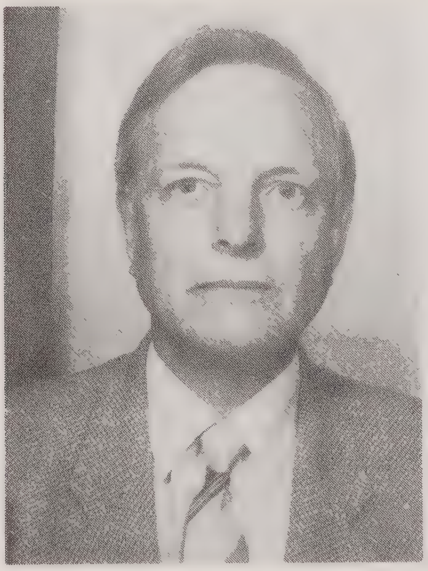


Dr. J. Lang

Situation Reports

The gas industry and the cement industry came under scrutiny in the afternoon. Dr. Frank Shephard (British Gas) showed how the gas industry has progressed since the 'paint it green' mentality that used to exist for environmental integration. For instance, leached out salt cavities underground could provide gas storage facilities to meet peak demand in the colder months. At the production end, coal gasification represented a method of coal use that was both efficient and environmentally acceptable. Gerry Bye (Blue Circle Industries Plc) cited dust and noise as the major pollutants of the cement industry — sources which the industry had been determined to minimise, to the tune of some £2.5 m per annum expenditure. Increased automation would result in further improvement: for example microprocessor control could have a stabilising effect on rotary kiln movement, which tended to fluctuate according to the rate of material movement through it.

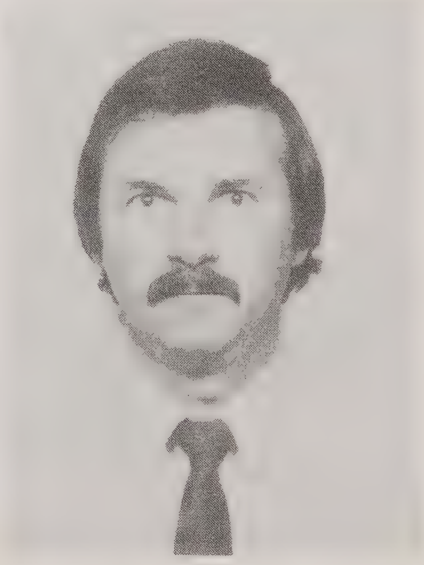

Dr. F.E. Shephard


Dr. G. Bye

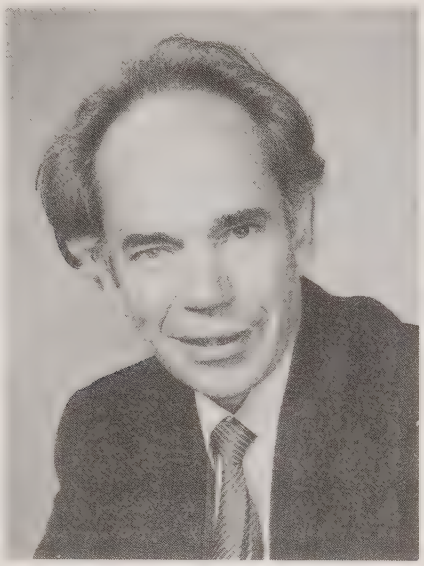
Nuclear news

The final day of Conference was devoted entirely to civil nuclear power. An excellent overview of the subject was

F.A. Fry

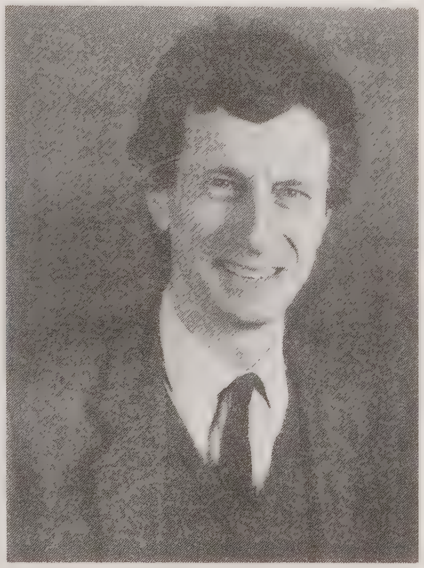

Dr. M. Courtis

given in the morning, ranging from radiation doses (Frances Fry, NRPB) to monitoring (Martin Courtis, Manchester City Council); and from the consequences of Chernobyl for the UK population (Keith Baverstock, MRC Radiobiology Unit) to the safety of civil nuclear power in the UK (John Collier, UKAEA).

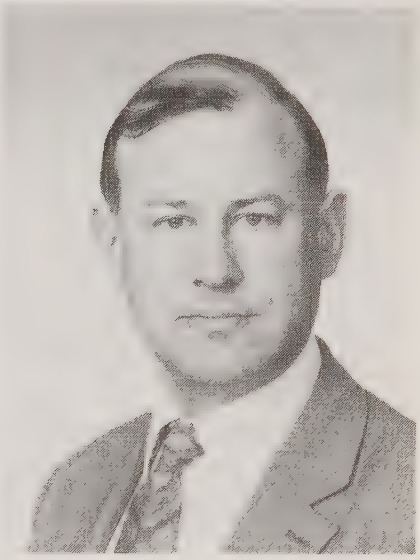


Dr. K. Baverstock

In the afternoon Robin Grove-White (Consultant) initiated a stimulating debate by questioning the whole basis of future energy scenarios with Frank Jenkin (CEGB). Robin Grove-White doubted that an ever-increasing demand for energy actually existed; it was, perhaps, more in the nature of a self-fulfilling prophecy. Frank Jenkin conceded that past prophecies had not always been accurate but remained convinced that the crystal ball was shedding light in the right direction.



R. Grove-White



F. Jenkin

In tribute

Ken Dunn, Chairman of Council, closed the 54th Conference with a tribute to the memory of Stanley Cohen who, sadly, had passed away on 19 October 1987. President of the Society from 1971–73, Stanley Cohen had been made an Honorary Member in 1986 – the highest honour that the Society could bestow. The Conference had seen a high level of presentation and participation on a wide range of topics; Stanley Cohen, with his slow smile and his pipe, said Ken Dunn, would have thoroughly enjoyed the proceedings.

Penny Gilbert
Editor

FUTURE EVENTS

1988

5 JAN 1988 – OPEN EVENING MEETING "Environmental Planning in British Gas plc"
Organisers: Institution of Environmental Sciences
Venue: Commercial Gas Centre, 139 Tottenham Court Road.
Details: Roy Waller. Tel: 01-647 5015 ('phone calls preferred) 26, Salisbury Road, Carshalton, Surrey SM5 3HD.

19 JAN 1988 – WORKSHOP "Aspects of Potable Water Quality"
Organisers: London Scientific Services
Venue: LSS Laboratories
Details: London Scientific Services, Seminars and Workshops, Room 755, County Hall, London SE1 7PB. Tel: 01-633 5975/4895

21 JAN 1988 – WORKSHOP "Sound Insulation"
Details: London Scientific Services (as above).

29 JAN 1988 – SEMINAR "Radiation Monitoring – The Role of Local Authorities"
Organisers: NSCA and London Scientific Services
Venue: County Hall, London SE1 7PB
Details: NSCA, 136 North Street, Brighton BN1 1RG. Tel: (0273) 26313.

2 FEB 1988 – WORKSHOP "Air Pollution Measurements"
Details: London Scientific Services (as above).

2 FEB 1988 – OPEN EVENING MEETING "The Workings of the Royal Commission on Environmental Pollution"
Organisers: Institution of Environmental Sciences
Venue: Commercial Gas Centre
Details: Roy Waller. Tel: 01-647 5015.

24 FEB 1988 – SEMINAR "Emissions from Incinerators and Other Combustion Sources"
Details: London Scientific Services (as above).

1 MARCH 1988 – WORKSHOP "Advanced Vibration Measurement and Analysis"
Details: London Scientific Services (as above).

3 MARCH 1988 – SEMINAR "Investigation of Contaminated Land"
Details: London Scientific Services (as above).

8 MARCH 1988 – SYMPOSIUM "Environmental Pollution – An Integrated Approach to Monitoring, Control and Abatement
Organisers: Warren Spring Laboratory
Venue: CBI Conference Centre, London
Details: Dr. H.J. Prosser, Warren Spring Laboratory, Gunnels Wood Road, Stevenage, Herts SG1 2BX. Tel: (0438) 741122.

10 MARCH 1988 – WORKSHOP "Asbestos in Buildings"
Details: London Scientific Services (as above).

17 MARCH 1988 – WORKSHOP "Construction Noise".
Details: London Scientific Services (as above).

23–24 MARCH 1988 – NSCA WORKSHOP
Organisers: National Society for Clean Air
Venue: Lincoln College, Oxford
Details: NSCA, 136 North Street, Brighton BN1 1RG.

28–30 MARCH 1988 – CONFERENCE "1st UK Healthy Cities Conference"
Organisers: WHO Healthy Cities Research and Information Centre, University of Liverpool
Venue: Liverpool
Details: Julie Kirkham, UK Healthy Cities Conference, Environmental Health Dept, 6 Brougham Terrace, West Derby Road, Liverpool L6 1JH. Tel: 051-264 7311 ext 1203.

10–14 APRIL 1988 – EXHIBITION & FAIR "Cities and the Environment"
Organisers: SEP / Pollution
Venue: Padua, Italy
Details: SEP / Pollution, E.A. Fiere di Padova, Via N. Tommaseo, 59, 35131 Padova. Tel: (049) 840.111.

25–27 APRIL 1988 – CONFERENCE "Gasification – Status and Prospects"
Organisers: Institute of Energy
Venue: Birmingham Metropole, National Exhibition Centre
Details: Conference Office, Institute of Energy, 18 Devonshire Street, London W1N 2AU. Tel: 01-580 0008.

27–29 APRIL 1988 – SYMPOSIUM "Handling of Environmental and Biological Samples in Chromatography"
Organisers: International Association of Environmental Analytical Chemistry
Venue: Sandoz Auditorium, Basel, Switzerland
Details: Workshop Office IAEAC, M. Frei-Hausler, Postfach 46, CH-4123 Allschwil 2, Switzerland. Tel: (004161) 632789 and (004161) 732950.

18–20 MAY 1988 – CONFERENCE "6th International Chimney Conference"
Organisers: CICIND
Venue: Brighton Centre, Brighton
Details: The Secretariat, CICIND, 136 North Street, Brighton BN1 1RG. Tel: (0273) 26313.

1989

11–15 SEPTEMBER 1989 – CALL FOR PAPERS – 8TH WORLD CLEAN AIR CONGRESS & EXHIBITION
Central theme: Man and his Ecosystem
Organisers: Vereniging LUCHT. Society for Clean Air in The Netherlands (CLAN)
Venue: The Hague, The Netherlands
Details: NSCA, 136 North Street, Brighton BN1 1RG. Tel: (0273) 26313.

LSS nsca

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BPEO AND THE WAY AHEAD FOR THE NSCA

by

IVOR BARKER

Immediate Past Chairman, NSCA Council

The "Way Ahead" report, adopted by the NSCA in 1981, reflected the changing perception of environmental pollution presaged in the 5th Report of the Royal Commission on Environmental Pollution. The Society accepted that the term "air pollution" now required more liberal interpretation and altered its Articles of Association to provide for the promotion of Clean Air, "having regard for the implications for other aspects of the environment". This objective was to be furthered by the promotion, investigation, consideration and discussion of "all forms of pollution" in order to achieve the reduction or prevention of air pollution.

It suggested that the selection of Best Practicable Environmental Option involves an analysis of the relative costs and benefits of different options for pollution control. The aim is to find the optimum method of disposal to achieve the maximum limitation to environmental damage at an acceptable cost to industry and the public purse. The limitation of pollution involves consideration of the quantity and polluting potential of the materials released and the sensitivity to them of different sectors of the environment. The smaller the combined effects of these variables the greater the environmental benefit.

The Royal Commission argued that the disposal of industrial wastes, be they solid, liquid or gaseous, should not be considered each in isolation one from another. Very often, choices exist as to the sector of the environment into which wastes can be discharged, ie to land, water or the atmosphere. These should be explored to determine which mode of disposal might be used to minimise environmental damage overall. In order to facilitate this comprehensive approach to waste disposal, the Commission proposed the establishment of a unified Inspectorate, to be called Her Majesty's Pollution Inspectorate, charged with the responsibility to seek optimum environmental improvement within the concept of Best Practicable Means. The then Alkali Inspectorate would be used as the model for the new inspectorate and their knowledge of industrial processes and many of their techniques would be incorporated to expand the concept of Best Practicable Means into one of Best Practicable Environmental Option.

BPEO

The controversy which greeted the proposal for a unified inspectorate, quickly invested with the acronym "HUMPI", somewhat overshadowed the significance of the concept of Best Practicable Environmental Option which underwent a protracted gestation period before appearing in embryo form in the RCEP 10th Report in 1985.

This Report referred to the "Cross Media" nature of many forms of pollution, ie the propensity of pollutants to pass from one environmental medium to another or to affect more than one medium simultaneously. The 10th Report attempted no definition of

BPEO but it gave some pointers. It emphasised that it is not a satisfactory policy to transfer disposal from one part of the environment to another without consideration of the comparative ecological and economic implications. The example of flue gas desulphurisation is used to demonstrate the point; every tonne of SO_2 captured produces four tonnes of sulphated limestone for subsequent disposal. Thus a solution to an air pollution problem creates a problem of land pollution, and possibly a water pollution problem from leachates. Conversely, the incineration of solid or liquid wastes as an alternative to landfill disposal transfers the pollution problem from land and/or water, to air.

The principle is maintained regardless of the scale of the pollution transfer as the following examples demonstrate:

- local complaints of noise created by bottle banks – a conservation measure
- indoor pollution aggravated by energy conservation measures
- increased production of sewage sludge following action to improve river quality
- transfrontier pollution resulting from high chimneys
- global climatic effects from use of fossil fuels as an alternative to nuclear energy or power from renewable sources.

In its 11th Report, dealing with waste management, the Royal Commission further developed the concept by discussing its application to waste disposal.

In more succinct terms, Dr. Martin Holdgate, in an address to the Royal Society of Arts last year proposed the following definition:–

"BPEO for a particular pollutant, waste or process is that alternative which achieves the minimum adverse impact on targets in all media, in the long as well as the short term, at practicable costs."

Given what might be regarded as interim definitions such as those quoted above, the debate now seems to concentrate on the responses which need to be made by regulators, legislators and by polluters (existing and potential) to translate the concept of BPEO into terms which can be understood and be applied to the complex spectrum of environmental pollution. There seems to be a consensus of understanding of what the concept is intended to achieve. Giving it form and substance to achieve practical solutions to real pollution problems however is, to quote one senior DOE official, to enter a philosophical minefield. The Royal Commission are presently addressing the topic of BPEO and their report is expected to be published in the New Year. In the meantime it is perhaps worth identifying the questions which are being raised and reviewing the developments which have already taken place in anticipation of the Report.

HMIP

The establishment of a comprehensive inspectorate to oversee and regulate waste discharges to the three media, land, water and air, has always been seen by the Royal Commission as a prerequisite to the effective application of BPEO. It is difficult to discern how the new inspectorate differs from the "HUMPI" first proposed in the 5th Report and yet it materialised on the 1st April this year in the apparent absence of any of the controversy which surrounded its first proposal.

The urgent task for the new inspectorate now is to establish an effective role vis-a-vis BPEO. At first glance, this appears not to raise insuperable practical problems. The former Alkali Inspectorate can cite examples where their intervention in scheduled processes has included consideration of the consequential effects on the other media of proposals to limit emissions to the atmosphere or to render them less harmful. It requires no quantum leap in imagination therefore that HMIP will quickly assume mandatory control of water and solid waste arisings from Scheduled Processes. Beyond the confines of registered premises however their role becomes less clear, having regard to the disparity which presently exists between the legislative powers available to the three arms of the inspectorate. The air inspectorate have at their disposal powerful regulatory tools and the benefit of long experience and skill in applying them. The powers available to their colleagues in hazardous wastes are by comparison, limited, and those of the water inspectorate virtually non-existent.

The success or otherwise of the concept of BPEO will depend to a large extent upon it being understood and accepted by the polluters. Progress towards that ideal will in turn be dependent upon there being in place a framework of comprehensive regulatory powers within which the inspectorate can establish their authority and develop their role. Given such a framework, the inspectorate can be a catalyst in the process of development of BPEO but a further question being raised concerns the adequacy of the resources available to them.

It has to be said that the initial establishment of HMIP is secure from criticism of being over-manned. At this stage in their development, however, how would one arrive at an objective assessment of the resources needed to promote and develop a concept such as BPEO? Such an assessment requires an appreciation and understanding of the function which the inspectorate will ultimately develop. Until the scale of that is known quantification of the resources required for its fulfilment can only be guesswork. In its first formative year the Inspectorate propose to carry out a number of studies of selected processes. While these are primarily intended to identify and quantify the wastes being produced and to assess their adverse environmental consequences and how these might be reduced, they may also indicate the resource implications of the new approach. HMIP are not, however, the sole repository of the knowledge, expertise and experience required to provide a regulatory dimension to the concept of BPEO. Local authorities have a long tradition in pollution control. They possess skilled resources capable of applying a high level of experience and sophistication to the development of BPEO. Not to utilise this resource would be an act of profligacy and local authorities will properly expect to be important participants in that development.

Consideration of the skills, knowledge and experience which are available brings one to the nub of the problem of defining what BPEO means; the philosophical minefield referred to earlier exists because hitherto pollution control has rarely been considered in conceptual terms which recognized inter-relationships between one form of pollution and another. Legislative responses to pollution problems affecting any given media have largely been reactive and have been designed to address one problem or range of problems in isolation and without regard to concomitant problems affecting other media. In the United Kingdom the single media approach has led to the development of institutionalised responses. Members of the many professions applying their skills to pollution control have become specialized in one particular field to the point of insularity. Successive generations of Alkali Inspectors concerned themselves exclusively with highly specialised aspects of air pollution control; factories inspectors concerned themselves with ensuring a safe working environment without regard to the consequences outside the factory; in local government environmental health officers and planners frequently imposed contradictory requirements on the same development; the 1974 local government re-organisation actually separated responsibility for refuse collection from that for refuse disposal between district and county councils, making only minimal requirements for effective liaison between the two; Regional Water Authorities have only the most attenuated of links with local authorities.

These are but a few examples of the traditional insularity which has typified the attitudes of professionals engaged in pollution control. Insularity is by no means confined to the regulatory agencies. Government departments are not renowned for sharing information or responsibilities between one another. Scientists and engineers engaged on research and development for new products have often been unaware of, or have given little attention to, the nature and quantities of process residues requiring disposal.

Given the "one-issue" mentality developed over many years and consolidated by piecemeal introduction of ad hoc legislation for environmental protection and pollution control, initial understanding of what BPEO means depends not so much upon the development of new techniques and administrative processes but upon fundamental changes of attitude among all who have a concern for, or a professional involvement in, the protection of the environment.

If BPEO is to succeed, attitudinal change is necessary at every level. National energy policy, for example, would ideally be formulated in the light of detailed appraisals of fossil fuels, nuclear energy, conservation and renewable sources rather than on short term political expediency. Decisions at regional or local level concerning new urban development and infrastructure will require co-ordinated appraisals of all of the factors likely to have an impact on the environment and of the implications of achieving the minimal adverse impact. Professionals will have to accept the possibility of their particular interest being subordinated to wider considerations.

At individual plant level, the options available may be relatively simple and straightforward but at all levels the most difficult decisions will be the value judgements which will determine the selection of the media to receive additional pollution and the acceptance of those judgements by all involved in the decision-making process.

At this early stage in its development, BPEO has to be addressed in conceptional terms.

It may be that in the fullness of time a level of understanding will be achieved which will transform the concept into a powerful, practical tool such as the concept of Best Practicable Means has become. For the moment however, it is not feasible to think of there being a particular BPEO for any given industry, activity or waste arising. The application of conventional measures pursued diligently within the conceptual framework is the path most likely to lead to a full appreciation of Best Practicable Environmental Option.

THE WAY AHEAD

BPEO, if incorporated into the framework of UK environmental controls and legislation, has obvious implications which relate to the role of the NSCA. It also relates to the perception of the NSCA role among its members and among those whom it would hope to attract as members.

The Society is heir to a long and proud tradition in the promotion and achievement of Clean Air. For many years the control of air pollution has been its raison d'etre and in the eyes of the general public air pollution has been seen as its prime concern. There are however some who believe that, having eradicated coal smoke pollution, the National Society had fulfilled its purpose. Such beliefs stem from a failure to recognise the true significance of Clean Air, ie the eradication of coal smoke pollution, as being the initial achievement rather than the ultimate. There is no shortage of examples to demonstrate the continued existence of air pollution by gases and substances which constitute no less a threat to human and environmental well-being than did coal smoke, merely because they are less visible to the naked eye. The Society has therefore quite properly maintained its historic identity with atmospheric pollution as a major concern.

Nevertheless, the "Way Ahead" report responded to the wider perception of pollution as being an entity rather than a collection of problems, separate and discrete one from another. The establishment of a Noise Committee demonstrated a commitment to noise as being a pollutant disseminated through the medium of air. The activities of the other standing committees have extended to include consideration of the interrelationships which exist between the control of pollution in one medium and its effects on other media.

Among those who are most active within the Society there is a full appreciation of pollution as being indivisible. Pollutants are never destroyed; they are transformed into substances which may have less polluting potential than the original, or which may be more readily disposed of in one or other of the media, land, water or air. This understanding is also being articulated in Best Practicable Environmental Option; a concept which, if widely adopted and pursued, has the potential to render obsolete the distinctions which traditionally exist between water, land and air pollution. In these circumstances there is a case to be made for the Society's objectives to be framed in terms which clearly demonstrate its recognition of pollution as being indivisible.

It follows that, as predicted by the "Way Ahead" report, the emphasis on "Clean Air" implied in the Society's title may become too limiting. The report recommended that the Council of the Society should keep this matter under review and it may be that the time is now right to act upon that recommendation.

The National Society for Clean Air has great prestige and is recognised as a learned, authoritative and responsible body in the field of air pollution control. Circumstances now dictate a need for the Society to promote its understanding of the changes which are taking place to affect the way that pollution is being perceived by the adoption of a new name which reflects the broadest objectives of pollution control.

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5) Institute of Wastes Management EYE Symposium May 1987. BPEO and Environmental Policy. D.W. Benjafield.
6) National Society for Clean Air. The Way Ahead. Report to the Council by the Policy Examination Committee. 1981.

BOOK BROWSING

THE BIG SMOKE –
A HISTORY OF AIR POLLUTION IN LONDON SINCE MEDIEVAL TIMES

by Peter Brimblecombe
Publisher: Methuen, 1987
Price: £25.00 ISBN 0-416-90080-1

This is a book for all readers, scholarly yet full of fascinating details describing the battle to abate the menace of coal smoke in London from the 12th century to the present day. For instance in the 16th century a collier named Grimes was summoned for erecting a smoky kiln near the present site of Thornton Heath station. Ladies complained of ruined complexions, furnishings and clothing suffered and of course, as we know, buildings became progressively blackened and corroded.

Peter Brimblecombe so aptly tells us of well meaning and persistent attempts at legislation through the centuries: attempts which were mostly abortive. "Where there's muck there's money" became more and more evident.

The writer of this review remembers, as a little girl, travelling home by train from a pre- First World War holiday in Clacton. Blue skies, corn fields and poppies gave way to an increasing gloom. The sky dimmed to a dirty yellow. The little black houses, the chimneys rearing up from factories, belching forth stinking smoke, mile after mile of murkiness, made a moving picture of a miserable environment in the early years of the present century.

The author examines the development of air pollution controls through the economic and social changes of the times and the effects of human health, furnishings, clothing and buildings.

The book ends with a more technical survey of present day conditions which are giving cause for concern in spite of the Clean Air Act which put an end to the evil of London Smog.

Doris E. Marsh

Editor's note:

Readers may like to know that Mrs. Doris Marsh, who kindly wrote this review for us, is the widow of Arnold Marsh, OBE. Arnold Marsh was Director of the NSCA for many years, retiring on 31 May 1968.

THE OFFICE ENVIRONMENT SURVEY – AN INVESTIGATION INTO THE PREVALENCE OF BUILDING SICKNESS

A Study Sponsored by the Health Promotion Research Trust Building Use Studies Limited 1987

This two stage survey (only stage one has been completed so far) describes a national study of office workers' perceptions of comfort and health, and reports on a questionnaire survey of 4373 workers in 46 buildings. These buildings were of varied age and quality and were selected to cover a range of ventilation systems. The organisations taking part included local and central government, professional consultancies and large private companies.

Focussing on a syndrome of symptoms associated with the occupancy of sealed office blocks, known as building sickness, the survey sought to establish its prevalence and whether certain buildings yielded higher levels. Also, since the study had a broad statistical basis, it was anticipated that hypotheses as to the causes of building sickness could be formulated for the purpose of further investigation.

Stage one of the project led to the conclusion that building sickness was the result of multiple and cumulative causes. Lack of personal control over office conditions in air conditioned buildings, and a sense of oppressiveness created by separating staff from the outside with tinted, sealed windows were the likeliest causes of building sickness. Also, any diagnostic investigation of building sickness should begin with a thorough and independent examination of the performance of the ventilation system before any costly modifications are embarked upon. Perhaps one of the most telling implications of the survey is that the causes of buildings sickness may well be traced to neglect of the complex services required in many modern buildings.

Essential reading for anyone involved in the building world or health.

THE DANGERS OF LOW LEVEL RADIATION

by Charles Sutcliffe
Publisher: Avebury 1987

Exposure to radiation is a problem of increasing importance as radiation based technologies proliferate: everyone is exposed to some natural and man-made radiation, but whilst exposure to natural radiation is largely unavoidable, exposure to man-made radiation is preventable.

This book summarises studies published mainly in the last decade, which indicate that the risks from low level radiation are considerably higher than the official estimates. They should not be taken as unambiguously proving that low level radiation is much more dangerous than suggested by the official figures, but rather that official estimates are open to serious question.

Readable, thought-provoking, disturbing, this book is not to be missed by anyone interested in the health effects of radiation, particularly cancer. All the evidence used is scrupulously documented; all technical terms are explained and there is also a useful glossary. An unemotional title belies the rather alarming nature of the tale.

ISBN 0-566-054825

INDOOR AIR QUALITY CONTROL TECHNIQUES –
Radon, Formaldehyde, Combustion Products

by W.J. Fisk, R.K. Spencer, D.T. Grimsrud, F.J. Offermann, B. Pedersen, R. Sextro

Publisher: Noyes Data Corporation, New Jersey, USA, 1987
Price: $36.00 US

The product of work sponsored by the US Department of Energy, this technical treatise provides an extensive overview of current knowledge in this vital field.

Reviewing and evaluating the indoor air pollutants which cause most concern – radon, formaldehyde, nitrogen dioxide, carbon monoxide, carbon dioxide and various respirable particles – the authors guide the reader carefully through the effects, sources, and methods of control. Ventilation and filtration systems are examined in great detail; then follows a literature review of the control of the various pollutants.

The authors emphasise that since people spend 85% to 90% of their time inside buildings, air quality indoors requires more attention than it has yet received. As an emerging health problem, contamination of indoor air has been linked with a wide variety of building materials and consumer products, as well as strategies that reduce the amount of infiltrating air as a means of promoting energy conservation. Humans and their pets also generate pollution: carbon dioxide, moisture, odours, and microbes, simply through normal biological processes. Other more important potential sources of indoor air pollution are combustion appliances, building materials, tobacco, and the soil under and around the structure.

A comprehensive and thorough account, this investigation into indoor air pollution would definitely be of value to all those concerned about this subject.

ISBN 0-8155-1129-9

TOXIC AIR POLLUTION – A COMPREHENSIVE STUDY OF NON-CRITERIA AIR POLLUTANTS

by Paul J. Lioy and Joan M. Daisey
Publishers: Lewis Publishers, Inc. 1987
Price: £36.95

Arising out of the Airborne Toxic Element and Organic Substances (ATEOS) project in New Jersey, this is a comprehensive, if rather technical, survey of many different types of air pollution and the associated health risks, particularly airborne carcinogens, in relation to cancer mortality incidence.

Leading the reader adroitly through the complexities of chemical composition and mutagenicity, inhalable particulate matter, volatile organic compounds, analysis of polycyclic aromatic hydrocarbons, and extractable organic matter receptor source apportionment models, the major sources, levels of distribution, and environmental and medical impact of air pollution are revealed.

The authors state, however, that this project should be seen as an historical database for future trend analysis, as well as an assessment of total air pollution exposure effects, so that it provides a significant resource for designing and implementing future studies.

ISBN 0-87371-057-6

THE GREEN CAPITALISTS – INDUSTRY'S SEARCH FOR ENVIRONMENTAL EXCELLENCE

by John Elkington with Tom Burke
Publisher: Victor Gollancz Ltd. London 1987
Price: £12.95

The authors here endeavour to show that, despite disasters such as Bhopal and

Chernobyl and the continuing willingness of some companies to pursue profits at the expense of the environment, there are many others with excellent track records in environmental awareness. Such companies realise that to achieve sustainable economic growth they must put as much back into the environment as they take out. Also, many new markets are created by a consumer generation which is increasingly cognisant of the environmental impact of industries.

Aiming to show that, although not a condition for business success in today's world, environmental excellence is nevertheless desirable, companies from many industries including the oil, chemical and biotechnology sectors are explored, and the development of new technologies to match new circumstances in terms of the relationship between industry and the environment are examined.

Essential reading both for the business community and for those concerned directly with environmental issues.

ISBN 0-575-04163-3

Studies in Surface Science and Catalysis
Vol 30
CATALYSIS AND AUTOMOTIVE POLLUTION CONTROL

Proceedings of the First International Symposium (CAPOC 1), Brussels, September 8-11, 1986

Editors: A Crucq and A. Frennet
Publisher: Elsevier 1987

The outcome of an International Symposium, this treatise offers a comprehensive survey of catalytic research for the control of automotive pollution.

Topics covered during the Symposium included a general introduction to the problems of exhaust gas pollution: effects on health, the environment, control of diesel particulate emissions, the difficulties of preparing and upholding uniform exhaust gas standards within the Common Market, and a review of the market for car exhausts in Europe.

There were also sessions on the role of catalysis in exhaust gas control; reaction mechanisms and surface states; metal-support interaction; base metal catalysts; practical studies; and fuels and additives.

The quality and scientific interest of the papers is excellent and this book is to be recommended to all those with a specialist interest in this area.

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ISBN 0-444-41801-6 (Series)

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ISBN 0-444-41801-6 (Series)

AIR POLLUTION ASPECTS OF ROOM-SEALED BOILER FLUE SYSTEMS

by

D.J. HALL
Pollution Abatement Division
Dept of Trade and Industry
Warren Spring Laboratory

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NATURE AND OPERATION OF ROOM-SEALED FLUES

There is a type of boiler flue system occasionally used on small to medium sized plant, known as a 'room-sealed' system, in which the boiler room is sealed to prevent the passage of air from anywhere except a single inlet. This inlet is a concentric tube running up the outside of the main boiler flue and terminating a short distance below it. The air drawn through this inlet is thus solely the boiler combustion air (with the possible addition of a relatively small natural convection). This, in its passage through the boiler room, also has to serve as the boiler room ventilation air.

The objective of the arrangement is to provide a form of balanced flue. Since the combustion air inlet and the flue outlet are situated close together it is possible in principle, as with all forms of balanced flue, to avoid the large fluctuating pressure differences between them that can occur in conventional boiler systems in strong winds. These pressure differences may produce unsteady and inefficient combustion in some plant. This is particularly the case when using natural draught as the small pressure differences driving the flue gases, usually at quite low flue gas velocities, are easily swamped by the greater pressures generated by strong winds. Such problems can occur readily on sites with surrounding buildings or topography of a greater height than the boiler stack, when strong downdraughts over the stack exit can be produced. More complicated aerodynamic effects can also cause combustion problems on less obviously difficult sites.

There are commercial designs of flue of this sort with special terminations, but it is also possible to achieve the same effect by setting up a conventional insulated flue inside a larger diameter pipe which is brought up to a height that is just below the flue outlet.

PROBLEMS OF ROOM-SEALED FLUES

The intention of a 'room-sealed' flue system, to maintain steady and efficient com bustion in difficult siting conditions, is laudable in itself, but can cause other problems.

Firstly, there can be problems with downwash of the flue gases down the outside of the stack. Since room sealed flues are mostly used with small, natural draught boiler systems, flue gas efflux velocities are low, often only a few metres/s. Also, the presence of the air inlet shroud close to the flue exit produces a stack of much greater bulk than with conventional flue arrangements. Both of these characteristics lead very readily to downwashing of the flue gases and a consequent loss of effective stack height.

Secondly, some designs incorporate flue terminations that cover the top of the flue exit, 'chinese hats' for example. These completely destroy the vertical momentum of the flue discharge. This both encourages the plume downwash problems discussed above and, even if downwash does not occur, reduces the plume rise and thus the effective stack height. It is helpful in this respect if the flue alone is extended beyond the inlet shroud by a minimum distance of half the shroud diameter. However, much greater extensions than one shroud diameter tend to reduce the flue balancing performance.

Thirdly, by setting the air inlet close to the flue outlet, it is readily possible to contaminate the boiler house with the flue gases. This is particularly so if the flue is sited in an area of erratic windflow or strong downdraught, precisely where it might be expected to be at its most effective. Some flue arrangements seen by the author use multiple flues set close together and here the probability of cross-contamination of an inlet is even greater. Most small boiler houses are designed to run unattended, particularly the room sealed variety, so that pollution problems from this cause should be limited. Nonetheless, some caution ought to be required of operators or service staff who have to work in operating room-sealed boiler houses.

Fourthly, the ventilation to the boiler house is limited to the combustion air. This is distinctly less than would be obtained in a conventional boiler room ventilated according to the relevant British Standard. Careful attention to the plant design is required if excessive ambient temperatures are to be avoided.

Finally, it seems doubtful whether any room-sealed flue design will produce effective performance over the whole range of wind conditions likely to be encountered. The detailed form of the flue outlet/air inlet arrangement at the termination is important if a good balanced flue type of performance is to be achieved. In the case of multiple flues serving a number of boilers, it is also necessary to use sealed compartments to the individual boilers with an individual flue connection to each.

STACK HEIGHTS FOR ROOM-SEALED FLUES

Chimney heights for room-sealed boiler flues and their placement with respect to nearby buildings, ventilation inlets, opening windows etc, should be determined by direct application of the Chimney Heights Memorandum (1) in the same fashion as for any other flue, since the nature and quantity of the pollutants emitted in the flue gases is just the same. Indeed, in view of the proneness of this flue design to downwash, as discussed above, there would be some justification for increasing stack heights a little beyond those indicated by the Memorandum.

It is not the case that the performance of this sort of flue is such that it permits stack heights that are significantly lower than would otherwise be required. Any suggestion that lower stack heights are permissible would appear to be based mainly on two incorrect arguments. Firstly, that this type of flue in some way reduces pollutant

(1) Chimney Heights — third edition of the 1956 Clean Air Act Memorandum. London, HMSO, 1981. ISBN 0 11 751556 6

emissions. The pollutants are, of course, produced in the combustion process and are not affected by any well-founded flue design. Secondly, that because it is possible to operate a room sealed boiler flue of low height in difficult siting conditions, then it is acceptable to do so. This latter argument appears to be the result of a confusion between the two different, unrelated, reasons for using a chimney stack. These are: first, to provide some draught in order to drive the gas flow through the appliance; and second, to ensure that the emitted pollutants are discharged at a sufficient height to disperse safely in the atmosphere. Room-sealed boiler systems may allow the draught requirement to be met with low stack heights in difficult siting conditions. However, this does not affect the pollutant dispersion requirement. In modern appliances this is normally the dominant purpose of the stack and sets the required stack height.

APPLICATION OF ROOM-SEALED FLUES

The application of room-sealed flues would seem to be mostly limited to gas or very low sulphur oil-fired appliances. It is only for these fuels that stack heights, determined by the Chimney Heights Memorandum to satisfy pollution requirements, can sometimes be lower than their immediate surroundings and this can make them susceptible to unsteady wind effects. For fuels with any significant sulphur content, the Chimney Heights Memorandum nearly always requires that the stack should protrude above its immediate surroundings in order to meet pollution requirements. In this situation the possibilities of wind-induced combustion problems are greatly reduced or eliminated and a conventional stack and boiler house ventilation should therefore be satisfactory.

Many of these small appliances running on gas or very low sulphur oil fuels are designed to run on natural draught. They are only able, as a result, to generate quite low flue gas velocities (usually below the requirements of the Chimney Heights Memorandum) up a chimney stack of relatively large diameter. Because of these low flue gas velocities, such designs are inherently very sensitive to erratic wind and downdraught problems. Room-sealed systems are often used to try to overcome these difficulties associated with what is essentially poor design. A better solution to the problem is to use an induced-draught fan to drive the flue gases at higher velocities up a conventional stack of smaller diameter. This produces a much greater resistance to wind effects and downdraughts, thus allowing conventional flue designs to work satisfactorily in difficult siting conditions. In addition, the higher stack exit velocity largely eliminates downwashing of the flue gases and produces a greater plume rise, thus increasing the effective stack height.

CONCLUSIONS

Whatever the benefits conferred by the room-sealed balanced flue approach may be, they are enjoyed only in the context of the avoidance of fluctuating pressure differences between combustion air inlet and flue outlet. As far as the control of pollution is concerned, the room-sealed flue does not enable lower stack heights or less constrained siting than would be required of any other flue design. Stack heights should continue to be calculated by reference to the Chimney Heights Memorandum irrespective of the details of the flue design.

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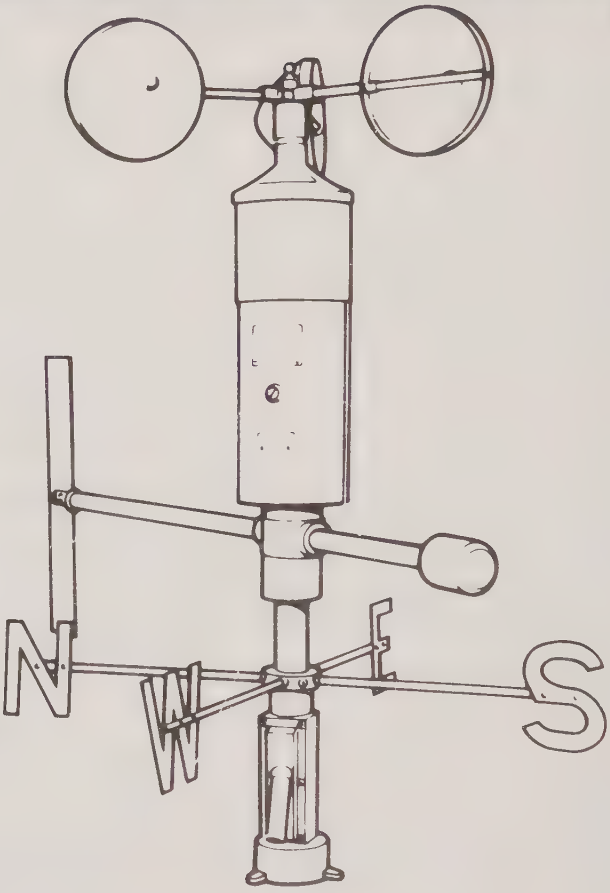

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ROUND - UP

When the Wind Blows

The windiest place in Britain — the Orkneys — is now the site of Britain's largest wind generator. Able to supply 2,000 homes with electricity through the Orkney grid, its output is the greatest of any single unit throughout the world.

Green and Quiet Lawns

Peace-loving gardeners will be gladdened by the news that the UK Regulation implementing the EC Lawnmower Noise Directive came into effect on 1 July 1987. From that date the marketing of certain noisy categories of lawnmowers is prohibited. For those with a head for such details, the relevant regulation is the *Lawnmower (Harmonisation of Noise Emission Standards) Regulations 1986 (SI 1986 No. 1795)* and the *Lawnmower (Harmonisation of Noise Emission Standards) (Amendment) Regulations 1987 (SI 1987 No. 876).*

Integrated Approach for HMIP

Pilot case-studies for an integrated approach to pollution control are now underway. The idea is to test the feasibility of developing an approach for the authorisation and control of industrial discharges which takes account of air, water and land pollution together, instead of separately under different statutes as happens at the moment. The sites chosen are Dow Corning Ltd in Barry and Winfrith Atomic Energy Establishment in Dorset: both have a range of processes potentially suited to an integrated control approach and will be studied for about 3 months. The results will be used to develop a further programme of case studies in 1988.

Cleaning Up the North Sea

The 2nd International Conference on the protection of the North Sea took place on 24 and 25 November. It agreed that the incineration of toxic wastes on ships in the North Sea should be severely restricted within two years and banned by 1995. All dumping of household rubbish from North Sea ships is to stop immediately and facilities in port for washing out ships' tanks are to be provided; British aerial surveillance will spot any oil dumping at sea. However, Britain remains the only country to continue to dump sewage sludge into the North Sea.

UK Launch for Lead-free

A 3-year programme of regional lead-free petrol weeks is underway in an effort to bring Britain up to the mark in the use of unleaded. Britain is lagging behind many of its EEC partners and CLEAR aim to raise public awareness of the availability of unleaded petrol (more than 500 filling stations sell it) and the number of cars that can run on it (10% without any modification). The regional weeks scheduled so far are:

November 20 – 27	Sussex
December 4 – 11	Kent
March 4 – 11	Essex
March 18 – 25	South Yorkshire
April 22 – 29	W. Midlands

Lead-free in Europe

EEC Member countries can now ban the sale of regular grade leaded petrol, provided six months' notice is given. *Council Directive 87/416*, agreed last July, makes provision for this in the hope that it will encourage further cuts in lead pollution from motor vehicles. Germany is making use of the measure, with a ban effective from 1 February 1988, and Luxembourg hopes for a ban on regular leaded from next July. Leaded supergrade will continue to be available.

Acid Drops Continued

The success of the pioneering WATCH Acid Drops project of 1986 has resulted in a second project for 1987-88. Started on 28 September, the new project will use twice the number of kits and extend into Europe, linking children right across the continent in one pollution monitoring network. Results of the '86 survey showed that

- pockets of persistently contaminated rain were still dotted around the UK
- although black spots were mainly around built-up and industrial areas, many remote and beautiful parts were seriously affected owing to their high rainfall – among them the Lake District, Wales and Scotland.

Joining the Club

On 2 September 1987 the *Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent* came into force, having been ratified by 16 States (Austria, Bulgaria, Canada, Czechoslovakia, Denmark, Finland, France, FRG, Hungary, Liechtenstein, the Netherlands, Norway, Sweden, USSR, the Byelorussian SSR and the Ukrainian SSR). Belgium, GDR, Italy, Luxembourg and Switzerland are expected to join before the end of 1987. This is the first binding international treaty with specific measurable targets for air pollution abatement and obliges signatories to reduce national sulphur emissions by at least 30% as soon as possible and by 1993 at the latest, based on 1980 levels. The ECE secretariat's recent survey showed that 10 countries had already reached the 30% reduction target in 1986, though these cut-backs are partly offset by emission trends in other countries.

Protection for the Ozone Layer

The UK has signed the *Protocol to the 1985 Vienna Convention for the Protection of the Ozone Layer.* The agreement to control CFCs and halons could come into force on 1 January 1989. In 1990 consumption of CFCs will be frozen at today's level, with a 20% cut 5 years later and a further 30% cut 5 years after that. Consumption of the halons – widely used in fire extinguishers – will be frozen at today's levels 3–4 years after the Protocol comes into force.

New Exempted Fireplace

The Babcock Worsley Fluidised Bed Combuster has gained approval for use in smoke control areas. Manufactured by Babcock Worsley Ltd, it must be operated as a single unit with the Tollemache Drier (made by Newell Dunford Ltd) and the Venturi Scrubber (manufactured by Air Pollution Control

Ltd.)

The Smoke Control Areas (Exempted Fireplaces) Order 1987, SI No. 1394.

New Tests for Water Quality

British Standard 6068 has gained 3 new Sections. There is an extension to the *Glossary (Section 1.5)* and a *Method for the determination of permanganate index (Section 2.32).* This is for measuring contamination by organic and oxidizable inorganic matter in domestic water with a chloride concentration less than 500 mg/L. *Section 5.7* gives a *Test for inhibition of oxygen consumption by activated sludge.* This contains information on inhibitory or stimulatory effects after a short exposure of the soluble test material on activated sludge micro-organisms. (Copies available from *BSI Sales, Linford Wood, Milton Keynes MK14 6LE.* Price: Part 1: Section 1.5 and Part 2: Section 2.32 £11.00 each (£4.40 each to BSI subscribing members), Part 5: Section 5.7 £16.20 (£6.48 to BSI subscribing members).)

Ways with Water

The unified approach to water pollution control will involve 4 main elements, according to an announcement in Parliament on 18 November.

- A "Red List", identifying a limited range of the most dangerous substances.
- The setting of environmental quality standards for all Red List substances.
- The setting of emission standards for industrial processes discharging significant quantities of these substances
- Further measures to control "Red List" substances from diffuse sources where necessary.

The new approach will require amendments to COPA 1974, Part II and will have a direct impact on industrial plants discharging heavy metals or dangerous organic chemicals in their waste water. New and refurbished plants will be looked at first, allowing any increases in industrial costs to be phased in and planned for.

Reassessing Radiation

A reassessment of fatal cancer in the survivors of Hiroshima and Nagasaki has resulted in stricter recommended dose limits for ionising radiation. The National Radiological Protection Board is recommending that, for the most exposed groups of workers, individual exposures be so controlled as not to exceed an average dose of 15 millisieverts per year. For the public NRPB advises that doses to the most highly exposed groups from effluent discharges should be so controlled as not to exceed 0.5 millisieverts per year for a single site.

Full details in *NRPB — GS9, Interim Guidance on the Implications of Recent Revisions of Risk Estimates and the ICRP 1987 Como Statement. HMSO, £3.00. ISBN 0 85951 293 2.*

Congratulations Bristol!

The whole of the City of Bristol is now smoke-controlled, with the recent declaration of its twenty first and final Smoke Control Order.

Many congratulations to all concerned.

OBITUARIES

STANLEY EDWARD COHEN, CBE

It is with the deepest regret that we record the death of Stanley Cohen at his home in Pinner on 19th October 1987 at the age of 90 years. A Vice-President and Honorary Member of the Society, he was President from 1971 to 1973 and Honorary Treasurer from 1957 to 1971 — having first become a member in 1952.

Stanley's career was remarkable by any standard. In 1914 at the age of 17 he added an extra year to his age to volunteer for active service in the Army. Twice wounded in action he was invalided in 1916 but maintained an active association with the Honourable Artillery Company into his 90th year. After returning to civilian life in 1916 he eventually formed his own business in the City of London concerned with the sale and maintenance of typewriters and office machinery. Becoming a Liveryman, this in turn led him to take an interest in the politics of the City during the inter war years. Following election as a Commoner in 1943, he became greatly concerned about the levels of air pollution then prevailing throughout London and, indeed, the country.

After the great smog of 1952 — when an extra 4000 deaths were recorded over and above the norm — he sought and achieved the Chairmanship of the Public Health Committee, a position which he held from 1954 to 1956. Largely through his drive and initiative the City of London was created the first smokeless zone in the land on 2nd October 1955. For his services he was appointed a CBE the following year. It was during this period that he first became active within the Society — promoting the cause of clean air in the City, nationally and internationally. In the 1960s he was instrumental in the arrangements for holding the 1st International Clean Air Conference in London. Next he was responsible for the Clause in the City's Various Powers Act 1971 limiting the sulphur content of oil.

As President of the National Society and its representative in the International Union of Air Pollution Prevention Associations, he travelled extensively in South America and Australia pressing the needs of air pollution control. Nor did he become any the less effective in his 80s in the 80s! A regular attendee at the Annual Clean Air Conference he continued to give Secretaries and Ministers of State the benefit of his advice in a series of trenchant letters. He was elected an Honorary Member of the Society at Blackpool in 1986. It was with the deepest regret we learned of his passing in the week before this year's Conference — which he had registered to attend.

A loving father, grandfather and great grandfather, we offer our profound sympathies to his beloved wife, Beatrice, and their family. We mourn with them the passing of a splendid gentleman whose impact for good for his beloved City of London – and the Nation – is part of history.

John Langston
Secretary General

JOHN CHRISTIE

Late Depute Divisional Officer, Air Pollution Division, Environmental Health Dept, City of Glasgow District Council.

John Christie was one of the Society's stalwart supporters and will be sadly missed by everyone who knew him. He passed away, after a short illness, on 28th October 1987 at the age of fifty-eight.

Having completed an engineering apprenticeship, John Christie started his career at sea and obtained both 2nd Class and 1st Class Certificates from the Board of Trade as a Marine Engineer. Towards the end of 1959, he joined the then Corporation of Glasgow Health and Welfare Department as an assistant Smoke Inspector. During his years in the Department he studied for his Higher National Certificate in Mechanical Engineering and also became a Member of the Institute of Fuel.

Never idle for any length of time, John was a keen golfer and water-colour painter. He is survived by his wife and family to whom we extend our deepest sympathy.

Ian MacPherson

LUCAS BENJAMINS

Late Chairman, The Filtration Society

The members of the Filtration Society throughout the world heard with great sadness of the sudden death of its Chairman, Mr. Lucas ("Dick") Benjamins in Holland on Wednesday, 29th July, 1987, after a short illness.

A founder member of the Filtration Society, Mr. Benjamins had combined ceaseless international travel for his own company, Amafilter, with meetings and discussions to foster the international links of the Society and had been working hard in the past year to increase membership in Europe. Mr. Benjamins was particularly proud of his appointment late in 1986 as a Knight of the Order of Oranje Nassau by Her Majesty Queen Beatrix of the Netherlands for services to his country in the field of industry.

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Late Chairman, The Filtration Society

The members of the Filtration Society throughout the world heard with great sadness of the sudden death of its Chairman, Mr. Lucas ("Dick") Benjamins in Holland on Wednesday, 29th July, 1987, after a short illness.

A founder member of the Filtration Society, Mr. Benjamins had combined ceaseless international travel for his own company, Amafilter, with meetings and discussions to foster the international links of the Society and had been working hard in the past year to increase membership in Europe. Mr. Benjamins was particularly proud of his appointment late in 1986 as a Knight of the Order of Oranje Nassau by Her Majesty Queen Beatrix of the Netherlands for services to his country in the field of industry.

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FINAL REPORT OF THE NSCA WORKING PARTY ON LEAD EMISSIONS FROM COLD BLAST CUPOLAS IN THE WEST MIDLANDS

July 1987

INTRODUCTION

As a result of differences of opinion regarding the amount of lead being emitted from cold blast cupolas at iron foundries within the West Midlands, it was resolved at the 1984 Annual General Meeting of the West Midlands Division of the National Society for Clean Air that a Working Party be set up with the object of attempting to arrive at the best estimate of the total quantity of lead emitted.

The Working Party was set up with representatives from Environmental Health Departments of six Local Authorities with iron foundries within their areas plus representatives from Her Majesty's Industrial Air Pollution Inspectorate, BCIRA and Midland Environment Ltd.

The membership of the Working Party is as follows:—

Mr. T. Townsend — Wolverhampton Metropolitan Borough Council (Working Party Chairman — April 1984 to April 1985 — Resigned April 1985).
Mr. J.P. Moore — HM Industrial Air Pollution Inspectorate (Working Party Chairman April 1985).
Mr. F.M. Shaw — BCIRA
Dr. R. Pocock — Midland Environment Ltd.
Mr. J. Evans — Dudley Metropolitan Borough Council [Resigned April 1985].
Mr. D. Payne — Walsall Metropolitan Borough Council
Mr. C. Brookfield — Sandwell Metropolitan Borough Council
Mr. A. Moore — Nuneaton and Bedworth Borough Council
Mr. C. Whitehouse — Wolverhampton Metropolitan Borough Council [replacing Mr. Townsend].
Mr. M. Rowley — Dudley Metropolitan Borough Council [replacing Mr. Evans — April 1985].
Secretary: — Mr. L. Medlycott — Wrekin District Council

A Programme of Work was decided at the first meeting, held in April 1984, and four objectives were formulated for the study areas. Briefly, these were:—

1. To obtain the best estimate of lead emitted from cupolas.
2. To obtain the best estimate of lead emission from road vehicles in the same area.
3. To estimate other significant emissions of lead to the atmosphere.
4. To identify the most significant impact of lead emission from cupolas in terms of the method of transfer relative to human intake.

ESTIMATE OF LEAD FROM CUPOLAS

Simmons[1] of the University of Aston in Birmingham, using estimates of heavy metal emissions from iron foundries in 1982, concluded that the annual emission of lead from cupolas in the West Midlands area was 77 tonnes per year; whereas Byrom Lees, a former research chemist and a member of the NSCA's Technical Committee, calculated an amended figure of 88 tonnes per year. A BCIRA estimate[2] presented at the same meeting was 51 tonnes of lead per year. In addition HM Industrial Air Pollution Inspectorate had estimated for cupolas with a melting capacity of 10 tonnes per hour, using low grade scrap, an emission rate of lead of 2 kg/h.

The first objective of the Working Party was to establish the exact number of iron foundries operating within the region, the annual amount of metal melted by each, the nature and type of metal being charged into the cupolas, and the type of arrestment plant employed.

Other information regarding the number of cupolas fitted with chimneys after the arrestment plant, and whether or not sampling points were provided in the chimneys, was requested in anticipation of stack sampling being undertaken.

However, in view of the high cost of stack sampling and the fact that no external funding was forthcoming, no stack sampling was carried out. Such sampling has been carried out in other parts of the country and the results obtained used in the compiling of this report.

A standard questionnaire (Appendix A) was devised and each Environmental Health Department in the region with iron foundries in its area was requested to obtain the information, the foundries being informed that it would be treated in confidence. The results of this survey are contained in Table 1.

An assessment of the annual lead emission rate from each foundry then had to be made. This was done by placing each foundry into one of five categories based on the type of scrap used, depending upon its likely lead content. Foundries using a high proportion of vehicle engine scrap were placed in a *high* category whilst those using a high percentage of clean steel scrap were placed in a *low* category, with *medium/low, medium* and *medium/high* categories in between. Results from 14 emission tests, given in Table 5, were used in deciding the emission of lead from cupolas in each of the five categories. Using data taken from these stack sampling results, carried out by BCIRA, British Steel Corporation and HM Industrial Air Pollution Inspectorate, an estimated lead emission per tonne of metal melted was given to each of the categories; these being *high* – 0.18 kg/tonne, *medium/high* – 0.12 kg/tonne, *medium* – 0.07 kg/tonne, *medium/low* – 0.05 kg/tonne and *low* – 0.03 kg/tonne.

Table 2 gives the estimated lead emissions in 1984 from cupolas in the West Midlands County, whilst Table 3 gives the estimated emission from the remaining cupolas in the West Midland region. In Table 4 the estimated lead emission from cupolas in each of the categories, *high, medium/high, medium, medium/low* and *low* is shown. As already stated, Table 5 records the results of all fourteen lead emission tests on cupolas known to the Working Party. The fact that measurements were made on both hot and cold blast cupolas is considered irrelevant so far as lead emission is concerned.

The estimated total annual lead emission for each foundry was then calculated by multiplying the relevant emission rate by the total annual tonnage of metal melted and these figures are given in Table 1.

It is estimated that 438.275 tonnes of metal were melted in cold blast cupolas in the West Midlands region in 1984. It is also estimated that as a result of these operations, 42 tonnes of lead were emitted during the same period.

A major source of lead from cupolas is lead in scrap petrol engines which may form up to 75 per cent of the metal charge put into cupolas, though in general it is much less and 42 out of 73 cupolas in the survey used no scrap of this description. From figures given below between 10 and 40 per cent of the lead in the petrol consumed by an engine in its working life remains in the engine or exhaust system.

A number of lead balances and analyses have been carried out on motor vehicle engines. A Ford Cortina engine[3] was found to contain the following amounts of lead:—

	Pb
Deposited in the combustion chamber	36.50 g
Deposited in the exhaust pipe	59.60 g
In oil and oil filter	31.07 g

Garibaldi[4] in a number of long term tests with different petrols on a FIAT engine with simulated city driving conditions obtained the following results:—

	Pb
Deposited in combustion chamber and exhaust manifold	11.59 — 71.17 g
In lubricating oil	3.63 — 28.87 g
In the oil filter	0.21 — 10.96 g
In the exhaust pipe	17.78 — 132.63 g
Emitted in exhaust gas	28.00 — 186.66 g

Campbell[5] has stated that with a standard exhaust system 340 g of lead stays in the vehicle for every 24,000 km of motoring.

In general[6] after 50,000 miles a 1½ litre engine will have had about 4 kg of lead passed through it. The engine will retain 10 per cent, or 400 g, and this will be distributed with about 80g in the cylinder head and exhaust manifold and the remainder in the oil and oil filter. For example[6] a Ford Cortina engine which had run 50,000 miles was shown to contain the following quantities of lead:—

Cylinder head	14.4 g
Exhaust manifold	38.6 g
Oil and oil filter	309.2 g

When old petrol engines find their way back to iron foundries for melting, the exhaust pipes and silencers have been removed and the oil and oil filters have been discarded. However, some oil remains, adhering to the crankcase and in an oily sludge in passages etc. This amount was estimated to contain 20 g of lead in the case of the engine described above. Assuming the weight of the engine to be 70 kg, and 100 per cent recovery of lead, there is a potential lead content of 0.10 per cent after melting this piece of scrap.

In addition to a tetra-ethyl lead, petrol contains halogen compounds whose function is to form volatile compounds with the lead after combustion of the petrol, so that the lead does not remain in the engine at its running temperature. The lead deposits in engines have been shown to consist of lead halides, sulphides, sulphates and oxides[7]. Hirschler et al[8] using X-ray diffraction analysis identified PbCl. Br, PbO, PbCl. In addition to PbO, there are Br, H_2O, $PbSO_4$ and NH_4 Cl.2PbCl.Br in engine combustion deposits; many of these volatile compounds evaporate at temperatures of about 400°C and so are unlikely to contaminate cast iron melts. Some, however, are not volatile and may give rise to lead in the metal on melting. Engine sludges from different lubricating oils have been found to contain [6] 0–0.25 per cent lead oxide, 0.50–1.70 per cent lead sulphate and 30.15 – 42.58 per cent lead halides. Lead is also present in other scrap which may be charged. Among other lead sources are:

- terne plate [lead-coated steel used for petrol tanks etc]
- lead based paint on scrap
- old vitreous enamelled scrap
- car wheel balance weights
- car body filler
- white lead putty in window frames
- leaded free-cutting steel
- some non-ferrous materials in scrap [some Monel grades, leaded phosphor bronze, solder]

It is not clear what compounds of lead are emitted from cupolas. At least some of that originating in petrol engine lead may be emitted as halides, since some of these are present in engine lead deposits[7], in which case it would be difficult to distinguish from petrol vehicle exhaust lead which is also associated with halides.

VEHICLE LEAD

To obtain an estimate of the amount of lead emitted by vehicles in the area during 1984, data on vehicle flows was obtained from various authorities. For the West Midlands County the total was 12,400 x 10^6 Km[9]. Data from rural areas was either not obtainable or only at a cost. Since the majority of cupolas were within the County, it seemed reasonable to compare cupola and vehicle lead emissions for this area.

In 1984 the permitted lead content of petrol was 0.45 g/l. Waldron[10] gave the average lead content of petrol in 1974 as 0.46 g/l. [The petrol engine scrap melted during 1984 will have used petrol of this lead level]. Knowing the vehicle miles travelled and the amount of lead in petrol and using a number of assumptions the vehicle lead emitted in the West Midlands can be estimated.

Assumptions

Proportion of lead in petrol emitted from vehicle exhausts, 75 per cent.

80 per cent of the vehicle miles travelled are by petrol engined vehicles[9].

Average fuel consumption is 10.65 Km/l [30 mpg].

Calculation then indicates a vehicle petrol lead emission of 315 tonnes per year for 1984 in the West Midlands County.

Our figure would suggest that the West Midlands County traffic flow is about 4.3* per cent of the national figure, which seems a not unreasonable figure, particularly when considering that the West Midlands has about 5 per cent of the country's population.

OTHER SOURCES OF LEAD EMISSION

A number of known potential sources of lead emission were investigated but only meagre data was available for some of them. Those with less than 1 t/year are considered insignificant in the context of this report.

1. Processes registered with HMIP as lead works or non-ferrous metal works.

Lead emission calculated from test results on chimney emissions[11] was 2.5 tonnes in 1984; to this must be added an unknown but significant amount from adventitious emissions particularly from two works. In addition some works recovering and manufacturing leaded bronzes and gun metal are only registered as copper works and, while they must emit lead, no measurements are available. Although full arrestment is fitted these may increase the total lead emitted from registrable processes to, say, 5 tonnes per year.

2. Processes registered with HMIP as iron and steel works — which includes one hot blast cupola installation.

There are no large iron and steel works remaining in the West Midlands. All works in this category have high efficiency fume arrestment and lead emissions are considered to be insignificant.

3. CEGB power generation

Information provided by the CEGB indicates that 22.25 million tonnes of coal was burnt at their Power Stations in 1984 in the Midlands area[12].

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* estimated from a vehicle lead emission of 315.t/y compared with 7275 t/y for the UK, a figure itself estimated from an emission rate of 75 per cent of 9700 t/y of lead in the petrol used.

Four analyses of coal[12] gave lead contents ranging from 23 to 66 ppm which averaged 42 ppm. On this basis lead in coal burned was 935 tonnes. CEGB coal averages 17.5 per cent ash containing 185 ppm average of lead [range 60 – 400 ppm]; the amount of lead in the ash collected was therefore 720 tonnes. By difference the lead emitted from boilers would have been 215 tonnes.

A second method of calculation uses the assumption[12] that the average collector efficiency of the precipitators is 99.3 per cent and that all the coal ash is presented to the precipitators in these PF fired boilers. This leaves 0.7 per cent of the lead to be emitted. On these assumptions the emission of lead will have been about 7 tonnes per year.

Another method of calculation can be used. Reported measurements[14] give lead in power station flue gases as 0.7 to 7 $\mu g/m^3$. Knowing the weight of coal burned [22.25 million tonnes] and the volume of flue gases per kg of coal to be about 7.4 m^3, [Perry's Chemical Engineers Handbook, 3rd Edition, Table 8, p1603] the weight of lead emitted can be calculated to be between 0.1 and 1 tonne per year.

By three different calculations based on different spot data we now have a range of 0.1 to 215 tonnes per year of lead emitted. The 215 tonnes per year figure relies on the subtraction of one large figure from another and averages of a range of lead contents in ash and coal. It is not likely to give an accurate answer. The figure of 7 tonnes per year obtained by assuming the lead emitted to be 0.7 per cent of the total lead in the coal burned [since an average of 99.3 per cent of solids are collected by the precipitators] is more difficult to fault except that the lead content is assumed to be independent of particle size. The figure of 0.1 to 1 tonne per year obtained by flue dust analysis should be the most accurate but it does seem to give a very low figure. In the absence of more accurate figures based on long term investigations we proposed taking a figure of 2.5 per cent of the lead in the original coal [935 tonnes per year] as the lead emission; this is approximately 25 tonnes per year. This figure must be treated with great circumspection.

4. Solid fuel burnt other than in power stations (including industrial use)

Fuel burned domestically and industrially is believed to be less than 5 per cent of fuel burned by the CEGB in the same area[15]. We have no figures for low temperature combustion conditions but the amount of lead emitted is probably not very great. Although arrestment plant may not be fitted, the coal is burned in the form of relatively large pieces rather than being in the form of pulverised fuel as in power stations. This would suggest that emissions from these sources amount to probably only about 1 tonne per year.

5. Local authority incinerators

Data[16] suggests that local authority incinerators emit 8 to 80 g of lead for every tonne of rubbish burned, with an average figure of 34 g per tonne. In 1984, in five incinerators, a total of 559,000 tonnes of waste was burnt [17,18]. The lead from these incinerators was therefore about 19 tonnes. In the Coleshill sludge incinerator about 42,000 tonnes of sludge was burned emitting on average 71 mg/kg[13]. This gives an emission of about 3 tonnes of lead per year, giving a total of some 22 tonnes per year from incinerators.

6. Cement works

No lead emission data is available but on the basis of fuel used compared with CEGB fuel usage and similar arrestment plant, the emission of lead from the three works in the area will be insignificant.

7. Galvanising

It is believed [without the evidence of measurement] that lead emission from galvanising is very low. The spelter used contains at most 0.1 per cent lead, which for the purpose of this survey can be assumed to be insignificant.

8. Non-ferrous foundries [not registrable with HMIP]

A few small foundries melt leaded brass or leaded gun metal and exhaust the furnace gases uncleaned to atmosphere. Emissions are likely to be at a maximum during relatively short periods of slagging and casting. Some airborne lead is also generated during finish grinding of the castings but this is very largely collected. We have no data on emissions but believe that they are insignificant.

9. Non-registrable lead operations

A major battery manufacturer has over 100 ventilation exits but emitted concentrations are low. Monitoring of ambient air indicates there is not a problem. These emissions were measured and found to be much less than the significant level of 1 tonne per year[19].

10. Lead loading of car bodies

Three operations were investigated. The total lead usage was 10 tonnes per year. As most of this is applied and ground off at the softening point or lower temperature, fume generation is negligible. Filtration plant is used to collect the dust generated. Even at 1 per cent emission to atmosphere this only represents 1/10 tonne per year.

11. Cable burning

Very little cable is burned legally in the West Midlands. Only one Registrable Works carries out lead recovery by melting and the amount is small. Losses to air are considered insignificant and less than 1/10 tonne per year.

12. Lead from the burning of waste oil

Lead gets into lubricating oil from lead in petrol. The lead which is not emitted on combustion is either deposited in the engine or exhaust system as ash or is absorbed by the oil. Sump oil as received can have 2000 ppm of lead but after recovery contains typically 800 ppm lead. Nationally 60 million gallons of recovered oil is believed to be burned, of which 60 per cent is used in roadstone plants[21]. In the West Midlands there are eight roadstone plants of which at least four use recovered oil. Their average consumption is assumed to be 100 gallons per hour for 10 hours per day, for 330 days per year[11]. On these assumptions, potential lead from roadstone plants is about 1.3 tonnes per year. However, these plants are fitted with either bag filters or medium efficiency wet scrubbers and some lead will be arrested; some may also stay on the stone. Therefore the lead emitted is likely to be lower than this. Lead from other users of recovered oil on the assumptions made above is 2.6 tonnes per year[21]. It could be therefore that in the West Midlands the total lead emitted from the combustion of recovered oil is about 4 tonnes per year but this figure relies very heavily on assumptions which could be challenged. Since the lead originated in petrol it is possible that some at least of these recovered oil lead emissions will also contain bromine and be indistinguishable from vehicle lead emission as far as atmospheric samples were concerned.

13. Glass works

Frit works lead emission is already covered under Registrable lead works. Non-registrable glass works are small and the emission of lead is likely to be under 1 tonne per year.

SUMMARY OF ESTIMATES OF SOURCES OF WEST MIDLANDS LEAD EMISSION IN 1984 OTHER THAN FROM CUPOLAS AND VEHICLES

Source	*Tonnes per year of lead emitted*
Registrable processes	5
Domestic and other Industrial processes	1
Local Authority Incinerators	22
Cement Works	<1
Power generation from coal	25
Galvanising	<1
Non-ferrous foundries	<1
Non-registrable lead operations	<1
Lead loading of car bodies	<1
Cable burning	<1
Combustion of recovered waste oil	4
Glass works	1
	Approximately 60 tonnes per year

Power stations and Incinerators appear to contribute much less lead [possibly 10 per cent] to the air than do petrol engined vehicles. However, with the reduction of lead in petrol these and other sources will become more significant but their effects will be minimised by the tall chimneys through which the emission takes place.

SUMMARY OF ESTIMATED WEST MIDLAND LEAD EMISSIONS FOR 1984

Cupolas	42 tonnes per year [36 tonnes per year in the West Midlands County]
Vehicles	315 tonnes per year
Other sources	60 tonnes per year

LEAD EMISSION FROM CUPOLAS IN TERMS OF THE METHOD OF TRANSFER RELATIVE TO HUMAN INTAKE

Although the Working Party originally listed this as one of its objectives, it was soon realised from discussions that without a significant expenditure of time and money — neither at the Party's disposal — could even reasonably probable conclusions be made on the effect, if any, of cupolas' lead emissions on humans. In the absence of funds, therefore, our comments have had to be qualitative rather than quantitative except where we could find some evidence in the work of others.

The majority of lead emitted from cupolas is contained in the grit, dust and fume present in the cupola stack. The simple wet arrestors, almost universally fitted, are fairly effective in removing grit, less effective in removing dust and almost ineffective in removing fume [the efficiency drops with decreasing particle size]. Fume is airborne and may travel some distance before it comes to ground level. Here, with lead from other sources, it may be deposited on plants and inhaled, thus getting into the food chain or directly into animals and people. For lead to be absorbed by living tissue it must be generally soluble in body fluids. Some compounds of lead are more soluble than others in aqueous media and some are more soluble in the acid conditions which are found in the stomach.

The Working Party did not know in what form lead is emitted from many of the sources but comparison with similar industries may give some guidance. It is known that in power generation the majority of lead is emitted as lead silicate[12], a compound of very low solubility in water. There is sufficient silica present in cupola emissions to be able to form silicates at the high combustion temperatures present in the cupola melting zone [though higher up the shaft temperatures are lower]. Cupola melting zone conditions are not dissimilar as regards temperature to boiler flame temperatures but are more reducing in most of the melting zone. Whether this promotes or inhibits the generation of lead silicate we have not investigated but it seems unlikely that it prevents it.

In the manufacture of copper from low grade scrap, using a furnace similar to an iron melting cupola, similar conditions occur at much lower temperatures. Some of the lead present becomes bound up in complex molecules much of which ends up in the slag [a small proportion of lead charged into cupolas also enters the slag]. Analysis of stack samples for lead is by such techniques as wet chemical analysis, X-ray fluorescence and atomic absorption, all of which measure total lead content and do not distinguish between the different forms of lead which may be present.

The lead/bromine ratio can give an indication of the amount of lead from vehicle exhausts. In this survey there are other sources of lead which contain bromine. These are cupola emissions[8] and recovered oil combustion products. Bromine in West Midlands air samples cannot be said to come uniquely from vehicle exhausts. It is known that the lead/bromine ratio in at least parts of the West Midlands is increased, both airborne and deposit samples showing the same trend[22]. It must be concluded that some lead comes from sources other than directly from vehicles but it does not pinpoint any particular source of lead. Since we have identified a number of appreciable lead sources apart from vehicles, it could have come from one or more of these. In particular cases it could have come from even a minor source of lead if the sample was taken in the immediate vicinity, especially in low traffic density areas, where vehicle lead would be low.

Walsall Metropolitan Borough Council carried out lead measurements in their area over the period 1975–1982 [22]. There follows a summary of the results obtained. The figures are averages of up to 12, monthly samples. Some sampling positions were not used for the entire 7 years.

Sampler	*Position*	*Average lead μg/m³*
WL	Near to the centre of 7 cupola sites	0.64, 0.69
WM	To west of same cupolas as sampler WL	0.23
WN	Adjacent to copper works	1.31, 1.65, 1.64, 1.51 1.16, 1.20, 1.57
WD	Boundary of urban area	0.52
WP	Near copper works, steel works and cupolas	1.23, 0.78, 1.34
WR	Town centre [2 cupolas 1 mile away to east and west]	0.83, 0.68, 0.80
WS	Near a copper works	0.79, 0.71, 0.90, 0.62 0.48, 0.30
WT	Cupola ¼ mile to south south west	0.82, 0.66, 0.69
WU	No cupolas for 5 miles, almost rural area	0.48
WV	Very near 2 cupolas	0.85, 0.47, 0.55
WX	Very near one cupola	1.05, 0.75, 0.45
WC	Near a copper works	1.30, 1.32

No sampler uniquely sampled lead from a single source nor were directional samplers used. It is impossible from these figures to infer that cupolas were solely responsible for raised lead levels.

In 1977 the Report of the Avon Gloucestershire and Somerset Environmental Monitoring Committee on a Survey of Airborne Metals was published. Many sites were surveyed, including 18 sites within about 1 Km of cupolas and usually other industry. These were: 2 in Bath, 2 in Kingswood, 1 in Northavon, 6 in the Forest of Dean, 4 in Gloucester and 3 in Stroud. Cupolas were not reported to be a cause of raised lead levels. Two of the relevant conclusions of the Report were:—

conclusion 2: the principal sites which showed the highest annual mean filter results were those situated near traffic sources ....

conclusion 3: secondary sites showing the highest levels coupled with the greatest frequency of lead uptake were those either situated near traffic sources, ... or situated in the vicinity of lead producing industry eg Bristol site 3 and Northavon site 9. [Neither of these was near cupolas].

Our survey has been concerned with airborne lead only and other work has shown that this contributes only a part of the total lead intake and body burden in humans[23].

If the assumption were to be made that lead from all sources was taken into the human body to the same extent, then the proportion due to any one source would be the same as the proportions emitted by that source of the total lead emissions. Further, assuming that all the lead emitted in the West Midlands County was involved, with no import or export to and from the area then 36/400 x 100% = 10% of the absorbed lead could be due to cupola operation.

This does not of course take into any account the distribution of lead from the various point sources identified either as cupolas or other lead emitters. However the Walsall study does not, over a long period, suggest that cupolas are a particular problem. Atmospheric sampling in an area where many cupolas operate did not necessarily produce higher results than samples in other areas.

SUMMARY OF THE FINDINGS OF THE WORKING PARTY

1. In 1984 the lead emission to atmosphere from cupolas was estimated to be 42 tonnes in the West Midlands area and 36 tonnes in the smaller West Midland County area.
2. Emission to atmosphere from motor vehicles in the West Midlands County area in the same year was estimated to be 315 tonnes.
3. Emission of lead to atmosphere from other sources in the West Midlands area was calculated to be very approximately 60 tonnes in 1984.
4. Raised atmospheric lead levels uniquely due to cupolas have not been identified and the Working Party is unable to comment on human lead intake, if any, from cupolas or any mechanisms for such an intake.

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TABLE 1: COLD BLAST CUPOLAS IN THE WEST MIDLANDS IN ORDER OF INCREASING LEAD EMISSIONS

	SCRAP IN CUPOLA CHARGE %							ESTIMATED LEAD EMISSION CATEGORY kg/t						
Foundry No.	*Heavy cast iron*	*Light cast iron*	*Scrap containing petrol engines*	*Steel*	*Steel bales (new)*	*Steel bales (used)*	*Cast iron briquettes*	*High*	*Med/high*	*Medium*	*Med/low*	*Low*	*Tonnes melted in 1984*	*Estimated lead emitted in 1984 kg*
								0.18	0.12	0.07	0.05	0.03		
25												X	100	3
43		45		5						X		X	48	3
63		50									X		70	4
52		9										X	165	5
32				31								X	330	10
15												X	400	12
62		90									X		250	13
51		35										X	470	14#
42		28									X		383	19
60	70											X	675	20
65	45			12							X		400	20
57	30?	30?									X		450	23
28		28	5								X		500	25
50			15	25						X			390	27
68	35?											X	900	27
34		25									X		850	43
59	30?	30?									X		900	45
5		30		10							X		1000	50
66	50										X		1100	55
49	28?	27?		15						X			850	60
27			16?	17?						X			945	66
73	38										X		1344	67
7	49		5	1						X			1015	71
17	40			10							X		1700	85
10	40			5							X		1800	90
22°		35									X		1800	90
11	25			25							X		2000	100
23	12	25			12						X		2000	100
67			75					X					590	106
40												X	3672	110
6												X	4000	120
26		59								X			2000	140
56			20	25						X			2000	140
45			55	5				X					850	153
72				50								X	5520	166
38	25										X		3600	180
46											X		3720	186
29										X			2800	196
48	25		15	30					X				1850	222
54	25	65								X			3360	235
69			43					X					1330	239
14	72		5	3							X		5000	250
58	20?		28?						X				2250	270
64				10								X	10000	300
71		40	30									X	10000	300
21				45	5							X	10320	310
30			35					X					2000	360
36				35								X	12136	364
61	90										X		7500	375
13			40					X					2300	414

TABLE 1 (CONTINUED)

	SCRAP IN CUPOLA CHARGE %							ESTIMATED LEAD EMISSION CATEGORY kg/t						
Foundry No.	*Heavy cast iron*	*Light cast iron*	*Scrap containing petrol engines*	*Steel*	*Steel bales (new)*	*Steel bales (used)*	*Cast iron briquettes*	*High*	*Med/high*	*Medium*	*Med/low*	*Low*	*Tonnes melted in 1984*	*Estimated lead emitted in 1984 kg*
								0.18	0.12	0.07	0.05	0.03		
20	60	25								X			6000	420
44			15	20						X			6000	420
8°			40					X					2400	432
31						50				X			6800	476
9	10		40	5				X					4000	720
16			45					X					4160	749
41°			25?						X				7000**	840
37	35									X			13630	954
53	36		16	1					X				8182	982
19			20	28					X				8515	1022
12°	28									X			14700	1029
39			32	5					X				8782	1054
70			50					X					5935	1068
33		9	26						X				10900	1308
2			24	10					X				14600	1752
55	30	28		2						X			25200	1764
47				35			5			X			40000	2000
1			25	5					X				16727	2007
35°			7	25						X			37130	2599
4			37	19					X				15804	2845
18°			36	20					X				16314	2937
3			37	19					X				18863	3395
24			50						X				27000	4860
												TOTAL	438275	41.9 t

* cupola equipped with a venturi scrubber
# Measured figure
° Foundry closed in 1985
** Estimated

TABLE 2: ESTIMATED LEAD EMISSIONS FROM WEST MIDLANDS COUNTY AREA COLD BLAST CUPOLAS (SANDWELL, WALSALL, WOLVERHAMPTON, BIRMINGHAM, COVENTRY AND DUDLEY AUTHORITY AREAS)

No. of cupolas	*Weight melted in 1984 tonnes*	*Estimated lead emission 1984, tonnes*
61	353657	36.4

TABLE 3: ESTIMATED LEAD EMISSIONS FROM THE REMAINING WEST MIDLANDS REGION COLD BLAST CUPOLAS, ie. EXCLUDING THE WEST MIDLAND COUNTY (CANNOCK, LICHFIELD, NUNEATON AND BEDWORTH, NEWCASTLE UNDER LYME, RUGBY, STRATFORD-UPON-AVON, WORCESTER AND WREKIN AREAS)

No. of cupolas	*Weight melted in 1984, tonnes*	*Estimated lead emission 1984, tonnes*
12	84618	5.5

TABLE 4: ESTIMATED LEAD EMISSION FROM WEST MIDLANDS COLD BLAST CUPOLAS IN DIFFERENT LEAD EMISSION CATEGORIES IN 1984

	Estimated lead emission category kg/tonne				
	High	*Med/high*	*Med.*	*Med/low*	*Low*
	0.18	0.12	0.07	0.05	0.03
No. of cupolas	13	9	16	21	14
Tonnes melted in 1984	101546	78806	122868	76367	58688
Estimated lead emission in 1984, tonnes	18.8	9.46	8.60	3.82	1.76

TABLE 5: LEAD EMISSION FROM ELEVEN CUPOLAS (INFORMATION SUPPLIED BY BCIRA, HM INDUSTRIAL AIR POLLUTION INSPECTORATE AND BSC.)

Plant	*Cold blast or hot blast*	*Melting rate t/h*	*Collector*	*Likely lead contamination of charge*	*Portion of charge which may contain lead*	*Specific lead emission kg/t*
A	CB	8	Multicyclones	Medium	10-20% Steel 20-30%? Heavy cast scrap	0.026
B	CB	10	Multicyclones	Medium	50% steel	0.068
C	CB	7	Multicyclones	Medium	25% steel	0.017
C	CB	7	Multicyclones	Medium	25% steel	0.027
D	CB	2	Simple wet arrester	Medium	10% steel 20% diesel scrap 25% cast iron scrap	0.031
E	CB	8	Multicyclones	Med/high	50-60% light steel	0.096
E	CB	8	Multicyclones	Med/high	50-60% light steel	0.08
F	CB	3.5	Simple wet arrester	High	30% light steel 40% petrol engine scrap	0.18
F	CB	3.5	Simple wet arrester	High	30% light steel scrap 40% petrol engine scrap	0.15
G	HB	16	Multicyclones	Medium	Probably high steel charge	0.062
H	CB	12	Simple wet arrester	Low	?	0.04
I	HB	?	Multicyclones	Med/low	Possibly high steel charge	0.07
J	HB	?	Cyclone	Med/low	Possibly high steel charge	0.07*
K	HB	20	Cyclone	Med/low	Possibly high steel charge	0.049*

* Plant assumed to be melting 40 hours per week.

APPENDIX A

nsca

west midlands division
national society for clean air

Department of Planning and Environmental Services
P.O. Box 212
Malinslee House
Telford
Shropshire TF3 4LL

Telephone: Telford (0952) 505051 ex. 510

WORKING PARTY ON LEAD EMISSIONS FROM IRON FOUNDRY CUPOLA FURNACES

Survey of Iron Foundry Cupola Furnaces currently active in the West Midlands Region

This questionnaire is in two parts. On the attached sheet you are asked to record information about each individual iron foundry works in your Authority area, to the extent that such information is readily available to you (where information is not readily available please just leave a blank).

Having completed the details of individual works, please then fill in the summary data below.

Summary Data

1. Total number of iron foundries currently operating in your Authority area ....
2. Total number of cupola furnaces currently operating in your Authority area ....
3. Your estimate of the number of these cupola furnaces typically operating on any one day (put either no. or %) ....
4. Name of Local Authority ....
5. Local Authority Officer for further contact if necessary (plus tel.no. extn) ....
....
6. Any comments you may have regarding pollution emissions from cupolas.
....
....
....
....
....
....

Return to: Dr. R. Pocock, Holte Building, Aston University, Gosta Green,
Birmingham B4 7ET

by 30th May, 1984 if possible

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Brighton BN1 1RG

Hon. Secretary: L.F. Medlycott

Founder Member of the International Union of Air Pollution Prevention Associations — IUAPPA
Associate Member of the International Union Against Noise — AICB

APPENDIX A

NSCA WORKING PARTY ON ATMOSPHERIC EMISSIONS FROM IRONFOUNDRY CUPOLA FURNACES

Ironfoundry survey phase 2

Please complete a separate sheet for each ironfoundry works currently operating a cupola furnace.

1 Name and address of company (or code number)

2 Approximate total weight of metal melted in 1984 (tonnes) ________

3 Approximate coke ratio (as % of metal charge) ______%

4 Most frequently used cupola charge, or estimated total for year (expressed as % of metal in charge, or by weight)

__________Pig iron

__________Foundry returns

__________Heavy cast iron scrap

__________Light cast iron scrap

__________Cylinder block scrap (petrol engine - put diesel under 'Heavy cast')

__________Steel

__________Steel bales - new production

__________Steel bales - used steel

__________Cast iron briquettes

5 Type of emission collector used (please tick)

None
Dry arrester
Wet arrester
Multicyclones
Venturi scrubber
Expansion chamber
Disintegrator
Penthouse
Other (specify)

6 Is the emission discharged from a chimney after arrestment? ____________

7 If so, are there sampling points in the chimney? ____________

8 Are there facilities for oxygen enrichment at the foundry? ____________

9 Any other comments relevant to atmospheric emissions

APPENDIX A

IRON FOUNDRY CUPOLA FURNACE SURVEY FOR .... LOCAL AUTHORITY (please complete)

FOUNDRY (Name & Address)[1]	No. of cupola furnaces at foundry	Furnace tonnage melt rate (+ p.hr. capacity)	Arrestment fitted, e.g. none/wet/dry/other (please give details)	Presence of oxygen enrichment/twin blast?	Stack height (state metres/feet)	Other information, complaints etc

Note 1: If you wish to keep identity of foundry confidential, please just give a code letter or number and record a cross-reference.

DIVISIONAL NEWS

REPORT ON THE NORTH WEST DIVISION'S SYMPOSIUM

Report on the Symposium — Radiation in Perspective — on 16 July 1987 at the British Gas North Western Lecture Theatre, Welman House, Altrincham, Cheshire

A highly informative programme and a prestigious venue attracted a good attendance at the Symposium on radiation. **Dr. R. McKeague** of the UKAEA's Process Technology and Safety Directorate gave an excellent overview of the different sources of ionising radiation and the different types: from alpha rays which could be blocked by a barrier of paper to gamma rays which required lead to stop them. Natural sources of radiation account for 87% of our exposure and only 13% comes from artificial sources, although any type of radiation can damage living cells, as Dr. McKeague pointed out.

Mr. Barry Frith of Manchester University's Radiological Protection Service spoke in more detail on the biological effects. Different types of radiation, he said, varied in their likelihood of causing cancer and some parts of the body were more susceptible than others. In ascending order, the susceptibility of tissue was: red bone marrow; bone; lung; thyroid; and breast. **Frances Fry,** Head of Environmental Measurements Department, NRPB, explained the principles of radiation measurement and dosage. The two routes of exposure were inhalation of airborne radiation and ingestion of radiation through food and water. The inhalation of radon gas was the largest single dose source for most people, with particularly high levels found in Devon, Cornwall and parts of Scotland.

Dealing with the legislative side, Barry Frith made it clear that for stochastic (chance or random) effects of radiation, no safety level was available — it was a question of deciding on acceptable levels of risk. In the case of radioactive waste disposal, dose limits for the public were set and the criteria for disposal included the volume of waste; its activity concentration; and the type of radioactivity present. For example, medical waste in the form of dressings, etc often had a high volume and high activity concentration but of very short-lived isotopes (typically 6 hours). Waste from the nuclear industry, of course, is classified into either 'low level', 'intermediate level' or 'high level'. Low level is of high bulk, short-lived and low activity; intermediate level is of high bulk and low activity but long-lived; and high level waste is of high activity and long-lived. It is the disposal of the latter category which causes such public concern.

Dr. D.H. Locke, Head of Information with the UKAEA, gave his views on the environmental consequences of nuclear power. In routine operation, he said, there was no damage to the environment: it was the possibility of accidents that had to be guarded against and this was done with a series of barriers against accidental release: the can containing the fuel; the reactor vessel; the concrete shield; and the containment building.

Dr. Martin Courtis, Principal Environmental Health Officer with Manchester City Council, showed how local authorities had a part to play in radiation monitoring – especially, perhaps, monitoring radon levels in homes. The Department of the Environment would provide funds for remedial action in "hardship cases".

It was a most interesting and enjoyable day and the North West Division are to be congratulated on its success.

Penny Gilbert
Editor/Librarian

NORTHERN DIVISION

Report on the Annual General Meeting, held at Easington, 17 July 1987

47 members attended the meeting at Easington District Council Offices where they were welcomed by its Chairman, Cllr. Alan Barker.

The afternoon's address was given by Dr. David Clark, MP, Shadow Spokesman for Agriculture and Rural Studies, who spoke on the pollution of our environment with particular regard to the North. He praised the North East of England for its exceptional beauty – Lakeland, the Scottish Border country and the N.E. coastline – and said that the area had developed its strength through steelworks, shipbuilding and mining.

Those three traditional industries had all but disappeared; the industrial base was diversifying but this was mainly through the intervention of foreign companies. Nevertheless any new development demanded high technology investment to ensure environmental protection was maintained together with the benefits of employment and production which new industries brought.

Turning to agriculture, Dr. Clark emphasised his commitment to finding alternative uses for straw in order to avoid burning it. As agricultural productivity increased, an agriculture policy had to be developed which would maintain improved production without creating an environmental loss. He cited the example of nitrogenous fertilisers polluting watercourses, which had resulted in sub-standard water quality in some parts of the country.

A lively question and answer session followed David Clark's talk. Topics raised included the lack of controls over dioxins, the possibility of the Polluter Pays Principle resulting in more job losses, the viability of alternative energy sources, and how answerable HMIP should be to local Councils. Dr. Clark felt that sophisticated monitoring was needed to cope with certain complex environmental problems (which could cause difficulties for small Authorities); that energy conservation was important as well as exploring new energy sources; and that pollution control at the local level — through Environmental Health Officers — was vitally important.

Mr. Alan Caygill, Senior Environmental Health Officer with Easington DC, proposed the vote of thanks. He commented too on the dilemma of Local Authorities trying to balance environmental protection with the need for employment. He looked for greater emission control on coal-fired and nuclear power stations and called for greater support for the coastal Authorities of Durham in improving the seashore.

W.C.B. Robson
Hon. Secretary

YORKSHIRE AND HUMBERSIDE DIVISION

Report of the retiring Hon. Secretary, David Bird

This year has been one of change for the Yorkshire & Humberside Division with the retirement of the Honorary Secretary and of the Chairperson. Perhaps most significant has been the closer working links with the Yorkshire & Humberside Pollution Advisory Council, giving us a strong regional and national voice by combination of our two strengths. Closer working arrangements involve both technical and policy discussions of issues raised to enable the region to have a strong voice in national policy. Particular thanks should be noted to Ivor Barker for his excellent leadership of the Division and, of course, his involvement as a leading figure in the Society at national level cannot be overlooked.

As with most Divisions the business has comprised a mixture of policy, debate, presentation from experts and visits to interesting sites such as the Opencast Coal Mines at Leeds; an indication of the close working between the Society and the YHPAC is that the visit to the opencast mine by the National Society was followed by a discussion on opencast mining at a meeting of YHPAC. With the renewed emphasis on environmental considerations and potential for further opencast mining in the pipeline, clearly the expertise gained within Yorkshire & Humberside will be of use to the Society in any national debate.

Finally I would like to record the Division's thanks to the Brighton HQ staff for their most excellent services.

David Bird
Retiring Hon. Secretary

In response to David Bird's kind words, the staff would like to thank David for his tireless enthusiasm and commitment and to wish him every success in the future.

Penny Gilbert
Editor

EAST MIDLANDS DIVISION

Report of a meeting held at the Normanton Park Hotel, near Oakham and at the works of Castle Cement (Ketton) Ltd on 17 September 1987

Nearly 60 members assembled at the Normanton Park Hotel on the edge of Rutland Water as the guests of Castle Cement Ltd. Mr. John Denton explained that the Company had begun in 1928 as the Ketton Portland Cement Company; Portland cement had been so named because, when mixed with aggregate and set, it resembled Portland Stone.

The necessary ingredients were Calcium, Silica, Alumina and Iron. Calcium and Silica could be obtained from chalk or limestone, and Alumina and Iron from clays or shales. At Ketton both limestone and clay were on the site which was also near to the coal fields; the top 40 ft of clay was taken off revealing 120 ft of limestone, which was obtained by blasting (lower limestone strata being unsuitable for the process). The quarry measured 1¼ miles across and had so far been cut 1¼ miles into the hillside. Some 400 acres of an 1800 acre availability had hitherto been excavated and this was expected to provide raw materials to the year 2050.

The clay and limestone remain separate until ready for mixing, but since there are parts of the face where clay and limestone intermingle the two materials are mixed at the crushing stage. A larger crusher capable of handling stones up to 1½ m^3 and with a capacity of 1800 tonnes per hour is utilised. The material then passes to a blending bed where a sampling station sends ½ kg samples by pneumatic transport to the laboratory where they are analysed by X-Ray spectrometry and the results produced on a computer. Each sample indicates the position during the previous hour and feeds can be adjusted to ensure the correct make up is maintained.

The material is fed to a blending store of 43,000 tonnes capacity; and at this point contains excess clay. Later limestone from a separate store is put back in to give the final mix.

The blended material, ground to the consistency of face powder, passes to intermediate hoppers from which it is swept out by a gas stream which is taken through large electrostatic precipitators to remove the dust. The blended material then goes to storage silos in readiness for feeding to the kiln. The material passes through a pre-calciner in the form of a tower in which 60% of the fuel is burnt. The calcium carbonate is converted to lime so that it can react in the kiln. Temperature is raised from ambient – about 20°C – to 1100°C in a minute. As the material traverses down the kiln it is brought to an almost molten state and forms cement clinker. The highest temperature is 1450°C. It is cooled rapidly on a grate cooler and twenty minutes later is at 70°C.

Heat from the waste gases is utilised:

- to heat combustion air;
- to dry the coal before grinding, and
- the coldest air then goes to atmosphere via a gravel tube filter.

The resultant material passes to a totally enclosed store with a capacity of 100,000 tonnes. A reserve is needed to meet demand during the annual overhaul when some four weeks are needed to reline the kiln.

The clinker is passed through a ball mill and 3–5% gypsum is added to act as a retarder. From the storage silos the cement goes out in bags (18%) or in bulk (82%). Approximately one third goes by rail and the rest by road.

The decision to invest £60 m in new plant had been dictated by economic considerations and the need to compete. The Company had adopted a policy of buying British, aiming at 83% and had achieved 80%. Output would be increased to 3000 tonnes per year per man as against a former figure of 2000 tonnes.

Dealing with Environmental considerations Mr. Denton said that the old plant had no arrestment equipment. In 1966 the original electrostatic precipitator was fixed. This threw out a lot of dust and was eventually taken out. The present arrestment plant is designed to achieve latest standards with one part of every plant broken down. The current requirement is 100 mg/m^3 and this can be achieved with one bank switched off. The main precipitator achieves 50 mg/m^3. Continuous monitoring had also been installed on every piece of plant.

At the conclusion of the presentation Mr. Denton answered a number of questions. He was thanked by the Chairman for the interesting and professional way in which he had dealt with the subject.

Members then partook of an excellent buffet lunch by kind invitation of Castle Cement (Ketton) Limited, before boarding a coach to be taken to the works. On site members were conducted round the various parts of the undertaking and the processes were explained by the guides who kindly accompanied us. The tour included being able to witness a very spectacular blasting operation.

The Division is greatly indebted to Castle Cement for the opportunity to make this visit, for the efficient way in which the meeting was run, and for the generous hospitality afforded us on that occasion.

E.F. Raven
Hon. Secretary

NORTH WEST DIVISION

Report of a visit to Fiddlers Ferry Power Station on 8 October 1987

Over 40 members of the North West Division visited Fiddlers Ferry Power Station on 8th October, prior to which they were invited to lunch by the CEGB. The visit proved so popular that it was oversubscribed by nearly 100% and a further expedition is likely during 1988.

The visit to Fiddlers Ferry was well timed, as the CEGB had recently announced that this station has been selected to be fitted with flue gas desulphurisation plant. Mr. Neish, Station Manager, told members that the regenerative method of FGD would be used, as distinct from the Limestone/Gypsum method. In the regenerative method, the chemicals which remove the SO_2 from the flue gases are recirculated and the concentrated SO_2 is converted to sulphuric acid. This method could produce, each year, up to 300,000 tonnes of sulphuric acid from a 2,000 megawatt power station.

Fiddlers Ferry is also well known for its low NO_x burners and members were able to see in practice what they had been told in theory. Altogether the visit was very successful and thanks are due to the CEGB in general and Mr. Neish in particular, for their help in the arrangements.

Future visits to Manchester Airport, Coalite Smokeless Fuels and Castle Cement are being arranged for the coming year.

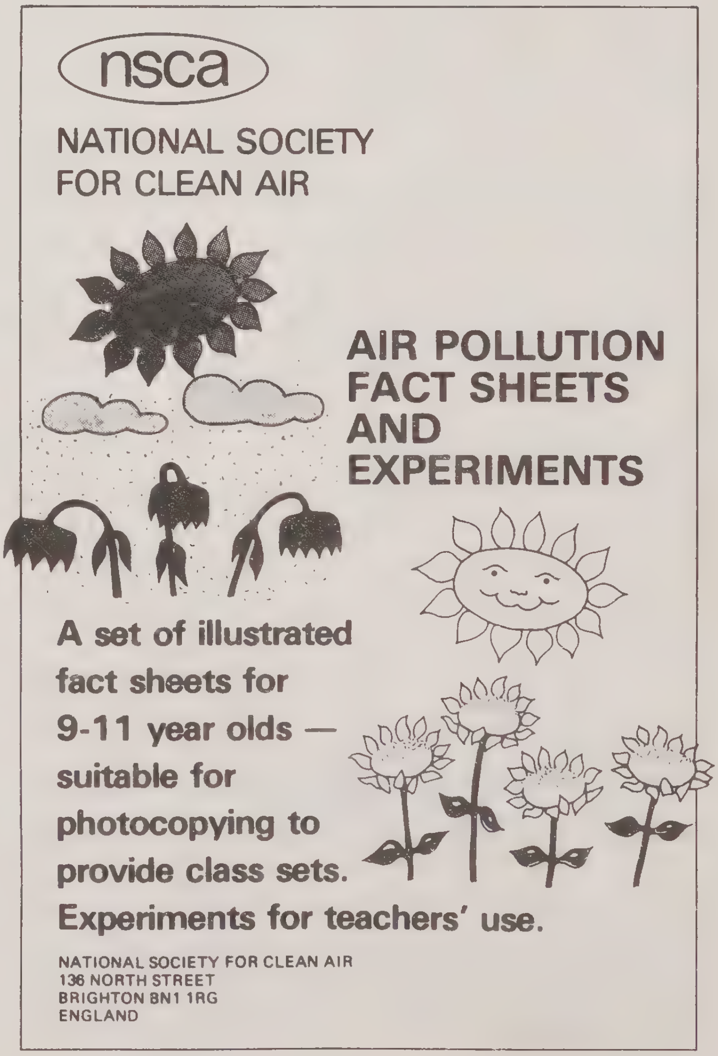
K.G. Kaufman
Honorary Secretary

AIR POLLUTION — NEW SCHOOLS PACK FROM NSCA

The National Society for Clean Air has produced with financial support from the Department of the Environment a set of air pollution fact sheets for 9—11 year olds, backed with teacher notes for simple experiments.

The 20-sheet pack has A4 format sheets which can be photocopied to provide class sets. Pollution problems such as smog, lead, acid rain, asbestos and the greenhouse effect are clearly explained. Using easily-available equipment and materials, there is a range of options from simple classroom activities to detailed fieldwork studies, and experiments can be adapted for use up to GCSE level.

Price: £1.00 inclusive of postage and packing from NSCA, 136 North Street, Brighton BN1 1RG.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ENGLAND

INDUSTRIAL NEWS

GAS SENSORS SHOW GREATER POTENTIAL

A new discovery by scientists at the Harwell Laboratory (UKAEA) means that UK companies will sponsor a second phase of research into gas sensors.

The two-year research programme will concentrate on exploiting the hitherto unknown behaviour of special thin film electrolytic cells in the presence of trace amounts of toxic gases. Harwell's miniature 'voltage effect sensor' offers considerable improvement over conventional gas sensing equipment which has to operate at high temperature and needs a bulky power source. Scientists are confident that the new sensor could be made small in size and operate at room temperature, requiring virtually no power.

The sensor could be worn as a small lapel device which would benefit mobile workers needing to detect toxic gases in low concentrations (eg carbon monoxide at levels of a few parts per million). Chemical processing and mining industries are showing interest in the development of sensitive gas monitoring devices that could be made simply and economically.

A full technological evaluation of the new device will be carried out through the Harwell Voltage Effect Sensors Consortium in collaboration with UK companies. The aim is to design a low-cost, reliable and sensitive device that could be fabricated with a high degree of reproducibility.

Reader Enquiry Service No. 8733

BIOTON BREAKS DOWN POLLUTION

A patented novel technology to combat air pollution has been developed in the Netherlands. It is a biotechnological method which utilizes micro-organisms for consuming various organic pollutants. Called Bioton, this bio-filtration system is in use by the pharmaceutical industry, food and drink industry, and sewage treatment plants.

The system has been developed by ClairTech B.V. in close co-operation with DHV, a major Dutch engineering consultant, and the inventor, Prof. S.P.P. Ottengraf of the Technical University of Eindhoven. On behalf of ClairTech, Licentec is currently searching for qualified licensees in the UK.

Contact: *Dr. T.F. van Geel, Licentec, PO Box 8323, 3503 RH Utrecht, The Netherlands. Tel: 31.30-945942. Fax: 31.30-947090.*

Reader Enquiry Service No. 8734

NEW FUME SCRUBBING SYSTEM FOR PRINTING INDUSTRY

Money-saving pollution control systems are on the increase. A new system called the Waterloo Scrubber cleans the gases driven off by printing ink during the drying process. In operation on a large four-colour press at Lawson Graphics, Toronto, Canada, it has eliminated the need for an incinerator system and produces an end product that pays for its operating cost — a hydrocarbon fuel suitable for use as a boiler or diesel fuel.

Reader Enquiry Service No. 8735

METAL BOX SYSTEMS CUT OVEN FUEL COSTS

Metal Box Engineering has recently signed a number of major new contracts to supply thermal and catalytic oxidisers for the recovery of primary heat from hydrocarbon exhaust gases emitted from ovens and other process plants. These include new projects in Switzerland, Holland, Italy and the UK for leading companies in coil coating, metal decorating, paper converting, and wallpaper manufacture.

The units are designed to reduce total fuel requirements by improving efficiency and the re-use of the heat generated, and to control air pollution by the oxidation of hydrocarbons.

Reader Enquiry Service No. 8736

INNOVATIVE SEWAGE TREATMENT SYSTEM TRIAL IN PLYMOUTH COMPLETED

The largest ever trials of a unique sewage disinfection system, which is based on simple household chemicals, have been successfully completed in Plymouth. The twelve day trial of the British Oxymaster system, was undertaken to demonstrate effective raw sewage treatment in a large Victorian system.

The trial was conducted by Interox Chemicals Ltd, Warrington-based manufacturers and developers of the system with the assistance of the South West Water Authority, Plymouth City Council and the Institute of Marine Environmental Research.

Reader Enquiry Service No. 8737

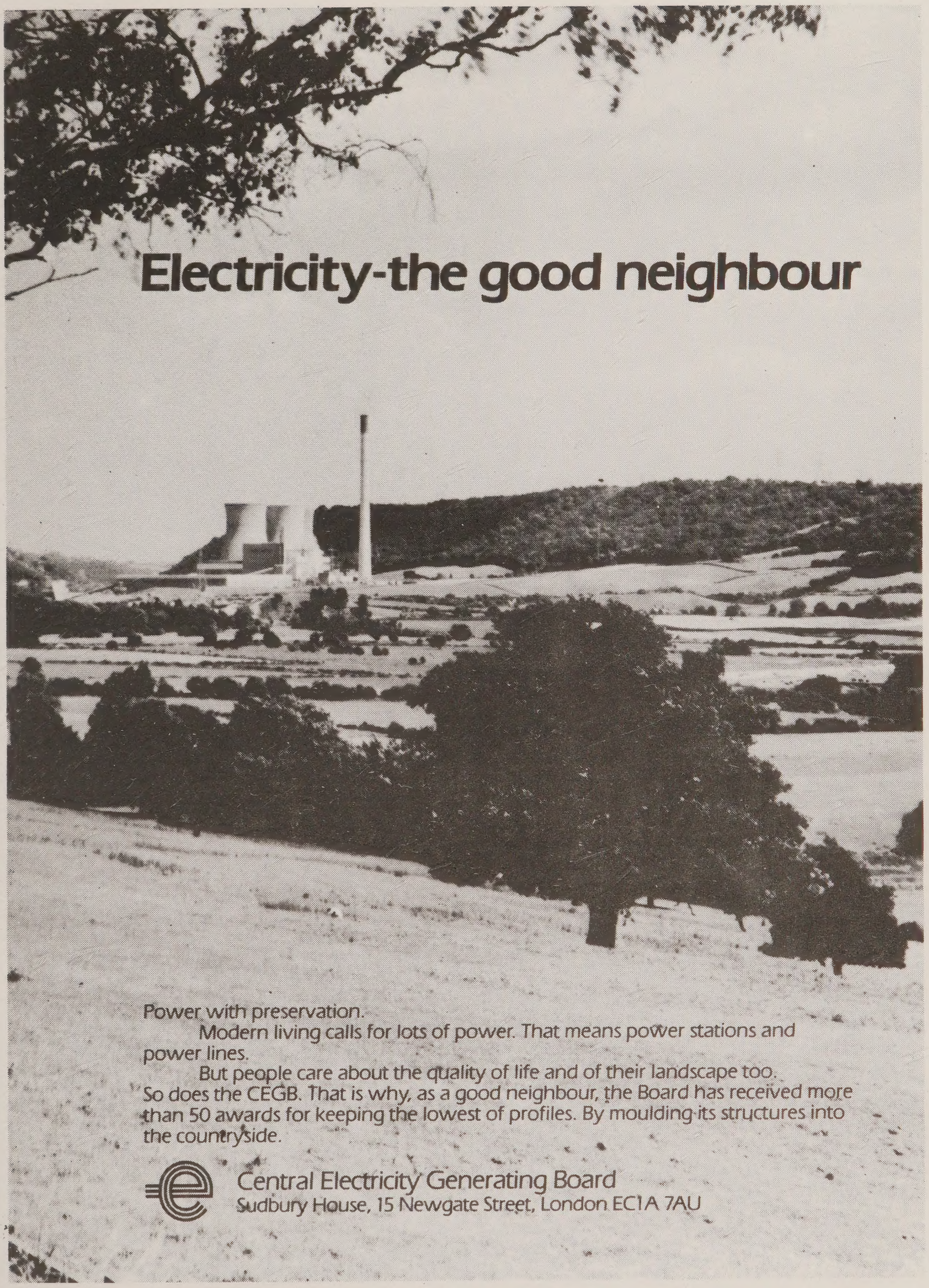
FUEL CELLS AS ALTERNATIVE ENERGY SOURCE

Fuel cell technology has an important role to play as an alternative energy source, according to Dr. Gary Acres of Johnson Matthey. Fuel cells, while similar in concept to a battery, generate electricity by feeding fuel and air to appropriate electrodes where a catalyst converts them into electrical power. The by-products are heat, carbon dioxide and water and it is a technology well suited to combined heat and power (CHP) applications.

Compared with conventional forms of electricity generation, fuel cells are also substantially more efficient, irrespective of power output. They are a British invention, yet their commercial development has occurred mainly in America and Japan where their potential for generating electricity at a local level is being examined.

Johnson Matthey is the major supplier of the platinum-based catalysts used in fuel cells; the company is currently co-operating with a number of international firms to investigate fuel cell applications.

Reader Enquiry Service No. 8738



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